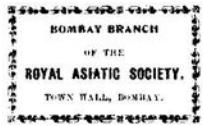
00109548

629.1331
Jan/All
109548



Digitized with financial assistance from the
Observer Research Foundation
on 25 April, 2019

00109548

WORKS :—
Tele phone :
7240 Victoria.
Telegrams :
"Chassilets [illegible]
London."

CHAS. JARROTT & LETTS LTD

West End Showrooms: 45, GT. MARLBOROUGH ST., LONDON, W.
Service Depot: PAGE ST., WESTMINSTER (1 minute from Victoria Station & Westminster Abbey)

Telephone :—
2367 Gerrard (3 lines).
Telegrams :—
"Jemidar, London."

Crossley

SPORTING SHELSLEY MODEL

The next best thing to flying is to fly uphill on a car that makes light of such work, and with abnormal acceleration.

The CROSSLEY has won for itself enormous success in open competition against the World's best cars.

The Sporting Shelsley Model is undoubtedly the smartest, fastest, most economical and reliable sporting car obtainable at a moderate price. It has a radiator of distinctive design, affording stream-line bonnet and bodywork, with a minimum wind resistance and a maximum of comfort.

The car is capable of obtaining a high average speed and is abnormally powerful for the size of the engine, which is 80 / 130, fitted with four speeds. The chassis price is £315, with tyres and detachable wheels, and with special two or four-seated body, £460.

Standard 15 h.p. Chassis £350.
,, 20 h.p. Chassis £475.

Illustrations, Catalog and Particulars on request.

The MotorHouse with the Reputation

"The Classic of Light Cars"

BUGATTI

This car, although nominally 8 h.p. and having cylinder dimensions of 65 × 100, is almost capable of doing what the average Sporting 40 h.p. will do. Its acceleration is phenomenal. It is fitted with four speeds, overhead valve gear, and is the most remarkable piece of miniature motor engineering ever produced.

One of these cars, in special test, covered 65 miles on one gallon of petrol. Under ordinary touring conditions it is capable of an average 50 miles to the gallon.

The chassis price, complete with tyres, is £185; special two-seated sporting body complete with accessories, £200; the distinctive three-seated boat type body, £250.

AN ENGINEERING MASTERPIECE.

THE WORLD'S FINEST LIGHT CAR.

Illustrations, Catalog and particulars on request.

ALL APPLICATIONS RESPECTING

ADVERTISEMENTS

FOR THE NEXT EDITION (1915) OF

"ALL THE WORLD'S

AIRCRAFT,"

TO BE MADE TO

W. H. PARSONS (Advt. Manager),

5, QUEEN VICTORIA STREET, LONDON, E.C.

ADVERTISEMENT RATES (per annum):

Whole Page	-	£10 Os. Od.	Nett.
Half „	-	£5 5s. Od.	„
Quarter „	-	£2 15s. Od.	„

ALPHABETICAL LIST OF ADVERTISERS.

	PAGE
"*Aeronautics*"	*inside back cover*
Anglo-American Oil Co., Ltd.	xii
Beatty School of Flying	vi
Bullivant & Co., Ltd.	2
Continental Tyre & Rubber Co., (Gt. Britain) Ltd.	xiii
Doutre, Appareils d'Aviation (*France*)	viii
Drummond Bros., Ltd.	xiv
"*Fighting Ships*"	ix
Gibson, Arthur L. & Co.	vii
Griffiths Bros. & Co.	*inside front cover*
Hamble River, Luke & Co., Ltd.	vi
Hoyt Metal Company of Great Britain, Ltd. ..	vi
Jarrott, Chas. & Letts, Ltd.	ii
Jones Brothers, Ltd.	I
Kaye, Joseph & Sons, Ltd.	xiii
Lakes Flying Co.	xiv
Mallinson, Wm. & Sons, Ltd.	xiv
Mea Magneto Co., Ltd.	xi
Owen, Joseph & Sons, Ltd.	xi
Parsons, W. H. ("*Aircraft*" Adverts.)	iii
Pemberton-Billing, Ltd.	I
Piggott Bros. & Co., Ltd.	xi
Pratt's Motor Spirit	xii
Read, H. H.	xi
Roe, A. V. & Co., Ltd.	I
Sampson Low, Marston & Co., Ltd.	ix
Short Brothers	x
Sopwith Aviation Co., Ltd.	xi
Statax Mfg. Co.	xii
White & Poppe, Ltd.	xiii
Wolseley Motors, Ltd.	I
Worsnop & Co., Ltd.	vi

TB. d 37

CLASSIFIED INDEX OF ADVERTISERS.

Accessories. PAGE

Anglo-American Oil Co., Ltd. xii
Jones Brothers, Ltd. 1
Kaye, Joseph & Sons, Ltd. xiii
Mallinson, Wm. & Sons, Ltd. xiv
Mea Magneto Co., Ltd. xi
Owen, Joseph & Sons, Ltd. xi
Piggott Brothers & Co., Ltd. xi
Pratt's Motor Spirit xii
White & Poppe, Ltd. xiii
Worsnop & Co., Ltd. vi

Accumulators.

Worsnop & Co., Ltd. vi

Advertisements.

Parsons, W. H. "*Aircraft*" (1915 Edition) ... iii

Aeroplane Builders.

Doutre, Appareils d'Aviation (*France*) ... viii
Hamble River, Luke & Co., Ltd. vi
Lakes Flying Co. xiv
Pemberton-Billing, Ltd. 1
Roe, A. V. & Co., Ltd. 1
Short Brothers x
Sopwith Aviation Co., Ltd. xiii

Anti-Friction Metals.

Hoyt Metal Company of Great Britain, Ltd. vi

Bearings.

Hoyt Metal Company of Great Britain, Ltd. vi

Carburettors.

White & Poppe, Ltd. xiii

Enamels and Paints. PAGE

Griffiths Bros. & Co. ... ... *inside front cover*

Engines.

Statax Manufacturing Co. xii
White & Poppe, Ltd. xiii
Wolseley Motors, Ltd. 1

Fabrics.

Continental Tyre & Rubber Co. (Gt. Britain) Ltd. xiii
Jones Brothers, Ltd. 1

Flying Schools.

Beatty School of Flying vi
Doutre, Appareils d'Aviation (*France*) ... viii
Lakes Flying Co. xiv
Sopwith Aviation Co., Ltd. xiii

Hangar and Shed Builders.

Piggott Bros. & Co., Ltd. xi

Hardwoods.

Mallinson, William & Sons, Ltd. xiv
Owen, Joseph & Sons, Ltd. xi

Life-Saving Jackets.

Read, H. H. xi

Machine Tools.

Drummond Bros. Ltd. xiv

Magnetos.

Mea Magneto Co., Ltd. xi

Motor Cars. PAGE

Bugatti Cars ii
Crossley Cars ii
Jarrott, Chas. & Letts, Ltd. ii

Motor Lamps.

Worsnop & Co., Ltd. v

Motor Spirit.

Anglo-American Oil Co., Ltd. xii
Pratt's Motor Spirit xii

Oil Cans.

Kaye, Joseph & Sons, Ltd. xiii

Publications.

"*Aeronautics*" ... ... *inside back cover*
"*Fighting Ships*" ix
Sampson Low, Marston & Co., Ltd. ix

Paints and Enamels.

Griffiths Bros. & Co. ... ... *inside front cover*

Ropes (Wire).

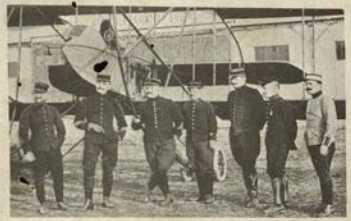
Bullivant & Co., Ltd. 2

Stabilisateurs.

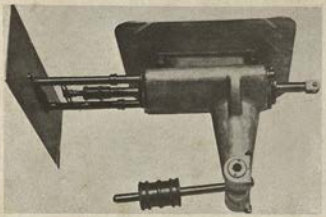
Doutre, Appareils d'Aviation viii

Steel Rolling Shutters.

Gibson, Arthur L. & Co. vii



ECOLE MILITAIRE DE CORBEAULIEU.



STABILISATEUR DOUTRE.

AEROPLANE DOUTRE.

BIPLANS TRIPLACES

les mieux construits, les plus surs et automatiquement stabilisés

ECOLE CIVILE ET MILITAIRE

Aerodrome de
Corbeaulieu
près Compiègne
France.

Sté des APPAREILS d'AVIATION DOUTRE

Fournisseurs des armées Françaises et Etrangeres.

LE SEUL
STABILISATEUR
AUTOMATIQUE PESANT
TOUT ÉQUIPÉ DOUZE
KILOGS ET AYANT FAIT SES PREUVES
PAR PLUS DE DEUX MILLE VOLS SANS ACCIDENT.
APPLICABLE À TOUS LES AÉROPLANES ET HYDROAÉROPLANES.

SÉCURITÉ ABSOLUE, VOL PAR TOUS LES TEMPS.

CATALOGUE FRANCO SUR DEMANDE - FETTERER DIRECTEUR GÉNÉRAL. 58 RUE TAITBOUT. PARIS. TÉLÉPH CENTRAL 37-53.

"FIGHTING SHIPS"

NAVAL ANNUAL FOR 1914.

Founded and Edited by FRED T. JANE.

Founder & Editor "ALL THE WORLD'S AIRCRAFT."

PLANS, PHOTOGRAPHS, AND ALL DETAILS OF EVERY WARSHIP IN THE WORLD.

SPECIAL ARTICLE ON
"MARINE ENGINEERING IN ALL ITS BRANCHES,"
BY
C. de GRAVE SELLS, M. Inst. C.E.

LISTS SHOWING THE
ROUTES OF EVERY MERCHANT SHIP of over 4000 Tons,
BY
W. A. BIEBER.

LONDON: SAMPSON LOW, MARSTON & CO., LTD.

HEAD OFFICE:
SEAPLANE WORKS,
ROCHESTER, ENGLAND.

SHORT BROTHERS.

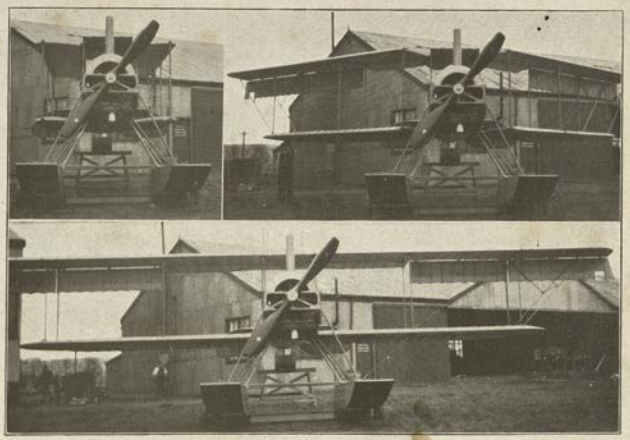
Contractors to
H.M. War Office, Admiralty and Leading Governments of the World.

LONDON ADDRESS:
QUEEN'S CIRCUS,
BATTERSEA PARK, S.W.

WORKS
EASTCHURCH,
ENGLAND.

'Phone:
9, MINSTER-ON-SEA

Tel.:
'FLIGHT,' EASTCHURCH.



WORKS:
ROCHESTER,
ENGLAND.

'Phone:
627 CHATHAM.

Tel.: 'SEAPLANES,'
ROCHESTER.

The new folding Short Seaplane, closed, half open, and open.

"SHORT" PATENT FOLDING WING SEAPLANES PAT. NOS. 1792/13.

READ'S LIFE-SAVING FLOATING JACKETS, as supplied to the Admiralty Naval Air Stations and WAR OFFICE.

Patent No. 985480 U.S.A.

AS WORN IN

The Daily Mail £5,000 Waterplane Race round Britain, August, 1913.

Photo supplied by Daily Mirror.

MR. H. G. HAWKER & MECHANIC WEARING THE JACKET.

WORN by Mr. Salmont in the "Daily Mail" Air Flights and the Members of the Monaco Boat Race Meeting, Aviators, Yachtsmen, Fishermen and Marine Motorists. Impossible to sink fully dressed.

London Doctor nearly drowned at Monaco.

TESTIMONIAL.

102, HARLEY STREET, CAVENDISH SQUARE, W. *April 30th, 1914.*

MR. H. H. READ.

DEAR SIR,

When my boat, *Angela III*, capsized in Monaco Bay when travelling at a speed of about 30 knots, I was wearing one of your Life-Saving Norfolk Jackets. Although to a certain extent "knocked out" by the force of the blow on my face when I struck the water, the great buoyancy of the Jacket gave me a feeling of perfect security and I was able to swim quite comfortably to the nearest boat, about 100 yards away. I did not experience the usual difficulty of getting out of the water on to the boat as one does when weighed down by wet clothes, as the buoyancy of the Jacket aided me in doing so quite easily.

Yours faithfully,

MORTON SMART.

Made in sizes 36, 38, 40, 42, 44 in. chest measure, **45/-**.

SEND FOR ILLUSTRATED PRICE LIST.

Sole Maker: H. H. READ, Falmouth, CORNWALL.

PIGGOTT BROS. & Co., Ltd. | AEROPLANE TENTS - -

Photo showing row of Canvas Sheds as erected at Brooklands for the "Daily Mail" £50,000 Flight.

Piggott's Patent Aeroplane Tents are the cheapest and most portable aeroplane shelters in existence.

Supplied to the War Office & Admiralty, and used by many well-known flyers.

Large Stock of AEROPLANE TENTS FOR HIRE.

220, 222 & 224, BISHOPSGATE, LONDON.

MEA

THE MAGNETO WITH THE BELL SHAPED MAGNET.

FOR

MEA MAGNETO AS USED ON 4-CYLINDER AERO ENGINES.

EASY STARTING, RELIABILITY AND HIGH SPEEDS.

MEA MAGNETO AS USED ON THE ROTARY GNOME ENGINE.

MEA MAGNETO CO., LTD.,
GRESSE BUILDINGS, STEPHEN STREET,
TOTTENHAM COURT ROAD, LONDON, W.

Telephone 2580 Regent. Telegrams: "Meahermet, Ox, London."

Telephone 3811 HOP. *Telegrams: "BUCHERON."*

JOSEPH OWEN & SONS, LIMITED.

SUPPLY EVERY DESCRIPTION OF

TIMBER

FOR

Aeroplanes, Seaplanes, Dirigibles.

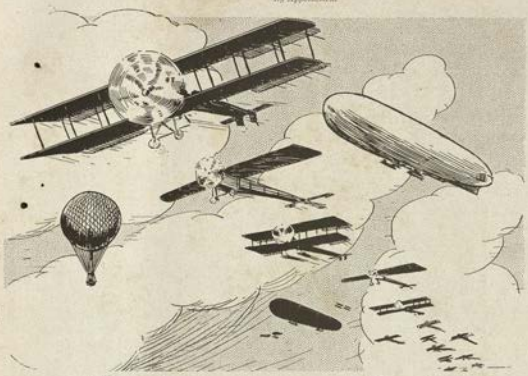
SEND YOUR ENQUIRIES TO

199a, BOROUGH HIGH STREET, LONDON, S.E.

PRATT'S

Perfection Spirit.

By Appointment

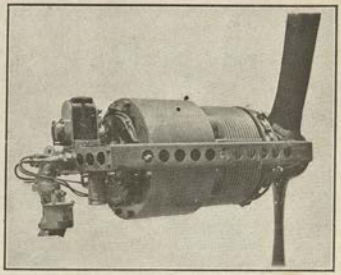


The importance of Fuel

IN every form of the petrol driven machine. Petrol is the life-blood of the mechanism. Upon its purity and unvarying excellence depends—in larger measure than any other factor—the performance of the engine. Hence the lesson of every experienced Airman—the Green Can—PRATT'S!

ANGLO-AMERICAN OIL CO., LTD., 36-38, QUEEN ANNE'S GATE, S.W.

A BRITISH ENGINE OF AN ENTIRELY NEW TYPE.



40 H.P.
5 Cyl.

STATAX

ROTARY AIR-COOLED MOTORS.

100 H.P.
10 Cyl.

STATAX 40 H.P. Motor.

The chief advantages of the Statax Engine are:

1. *Single piston valve.*
2. *Minimum wind resistance.*
3. *Adaptability to any design of aeroplane.*
4. *Great economy in petrol and oil consumption.*
5. *Small weight per H.P.*
6. *Simplicity of valve gear.*

Manufactured in England by:

STATAX MANUFACTURING CO.,

1, QUALITY COURT, CHANCERY LANE,

Telegrams: "STATAXABLE," London.

LONDON, W.C.

THE SOPWITH AVIATION Co. Ld.

MANUFACTURERS OF

AEROPLANES & SEAPLANES.

THE SOPWITH SEA SCOUT WON
THE SCHNEIDER CUP, 1914, AT
THE EXTRAORDINARY SPEED OF
140 KILOMETERS PER HOUR

Contractors to His Majesty's Admiralty and War Office.

Offices & Works: KINGSTON-ON-THAMES, ENGLAND.

Telegrams: "SOPWITH, KINGSTON." *Telephone* 1343 / 1777 *Kingston.*

KAYE'S

LATEST PATENT STEEL

SERRATED SEAMLESS OIL CANS

Fitted with NEW PATENT THUMB BUTTON and
PATENT SEAMLESS SPOUT, also in Copper or Brass, for Electrical purposes.

60,000
Recently supplied to the British Navy.

Managing Director: W. K. KAYE, M.I.Mech.E.

SOLE MAKERS:—

JOSEPH KAYE & SONS, Ltd.,

Lock Works, LEEDS, and 93, High Holborn, LONDON, W.C.

Determination &—

To our determination to produce "the best" in Petrol Engines we attribute our success and—
To our unwavering adherence to that policy—the unequalled dependability of every

White and Poppe product.

The W. & P. Aeroplane Engine is a typical example—it represents the very latest practice and possesses numerous excellent and exclusive features of great interest and usefulness to aviators generally.
It is an 8 Cylinder V Type of 120 M.M. bore 160 m/m stroke, and develops 140 H.P. at 1,200 r.p.m.
Full details of Engines for Aeroplanes and Airships, and of the World famed White & Poppe Carburettor for all types of engines, will be sent upon request.

WHITE & POPPE LTD., COVENTRY.

Dependability.

The World's most famous Aircraft have been fitted with

"Continental"

AEROPLANE & BALLOON SHEETING.

It combines maximum resistance with enormous strength, and is unaffected by atmospheric conditions.

PARTICULARS ON REQUEST.

CONTINENTAL TYRE & RUBBER CO. (GT. BRITAIN) LTD.,

3/4, THURLOE PLACE, LONDON, S.W.

TIMBER FOR AIRCRAFT

UNEQUALLED FACILITIES FOR SUPPLYING PERFECT TIMBER.

SPECIAL SKILL AND GREAT EXPERIENCE DEVOTED TO ORDERS FOR
— AIRCRAFT WOODS. —

MULTIPLYWOOD FOR WINGS AND FLOATS.

WILLIAM MALLINSON & SONS, Limited,

TIMBER & VENEER MERCHANTS (Direct Importers & Exporters),

130-138, Hackney Road, LONDON, N.E.

Telegrams: "ALMONER," LONDON. Telephone: 4770 LONDON WALL. P.O. 3854 CENTRAL.

CORRESPONDENCE IN ANY LANGUAGE.

PARIS: 7 Rue Titon. *ROTTERDAM: 22 Westzeedijk.*

WATERPLANES ONLY.

First and Safest British School.

Flights and Floats.

Sykes Flying Co.

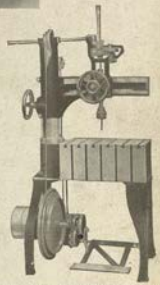
TUITION.

Established 1911.

Apply to The Manager, Cockshott, Windermere.

WE specialise in Light Machine Tools for use in portable workshops, such as are used in connection with aircraft. The above is a photograph of a Travelling Workshop equipped with our 5 in. lathe and Radial Drill, both of which tools are fitted with treadle and electric motor drive. Full particulars of machines and installations furnished on application.

5 in. Centre Screw Cutting, Surfacing and Boring Lathe here shewn, with counter shaft for power. With counter shaft or treadle drive. Price £44.



Light treadle driven Radial Drill, taking up to 1 in. drills (¼ in. shank.) This machine is of special design, a patented form of high speed drive giving ample power for drilling by foot. With treadle and fast and loose pulley. Price £24 15s.

Also 4 in., 3½ in., 6 in., 7½ in., 9 in. lathes, etc.

DRUMMOND BROS. LTD., REDE WORKS, GUILDFORD, SURREY.

'Phone 133, Guildford. Telegrams: "Lathes, Stoughton."

This space was occupied by a German firm, whose advertisement has been cancelled on account of the War.

Telegraphic Address: "JONBRO." Manchester.

JONES BROTHERS

LIMITED.

Spinners & Manufacturers,

12, YORK STREET,

MANCHESTER.

BEDFORD NEW MILLS.
LEIGH, LANCASHIRE.

THE "AERO" COTTON FABRICS FOR AEROPLANES.

WOLSELEY

LIGHT AERO MOTORS.

75 H.P. Semi air-cooled.
90 H.P. ,, ,,
90 H.P. Water-cooled.
130 H.P. ,,

Catalogue free on application to

WOLSELEY MOTORS, Ltd.

(Formerly The Wolseley Tool & Motor Car Co. Ltd.)

Adderley Park, BIRMINGHAM.

Proprietors: **VICKERS LIMITED.**

London Depot: York St., Westminster, S.W.

THE 1911 AVRO.

IN ALL THE WORLD'S AIRCRAFT—

there is none with a finer record of pioneer work than the

AVRO

The 1911 Avro was the forerunner of the present-day machines. Its general outline is accepted as the standard of aeroplane design all over the world.

SEE THE RECORD BREAKING 1914 AVRO.

NOTHING BETTER.

A. V. ROE & Co.

LIMITED,

Contractors to Admiralty, War Office & Foreign Governments,

CLIFTON ST., MILES PLATTING
MANCHESTER.

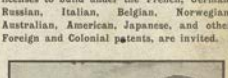
Telegrams: "Triplane."
Telephone: 237, Failsworth.

PEMBERTON-BILLING Ltd.

IN FULL FLIGHT.

ILLUSTRATION demonstrating the latest type of **SUPERMARINE.** P.B.-7. Span, 57 ft. 6 ins. Overall length, 34 ft. Weight, 3,000 lbs. Engine, 225 h.p. Speed, 45-70 m.p.h. Fuel capacity, 4 hours. Under stress of weather, at the will of the pilot the aeronautical impediments is instantly detachable, leaving an ordinary high-speed motor craft, which contains the engine, pilot, passengers, petrol, instruments and gun, and is equipped with water propeller and rudder, having a distance range of 200 miles and a speed of 35 knots.

Built under Pemberton-Billing's patents, at his Southampton Works. Applications for licenses to build under the French, German, Russian, Italian, Belgian, Norwegian, Australian, American, Japanese, and other Foreign and Colonial patents, are invited.



SLIPPING THE WINGS.

SOUTHAMPTON, England.

BULLIVANT AND CO., LIMITED

MAKERS OF

STEEL WIRE ROPES

BULLIVANTS' FLEXIBLE & EXTRA FLEXIBLE STEEL WIRE STRANDED CORD FOR AIRCRAFT.

MAXIMUM FLEXIBILITY. STRENGTH.
MINIMUM DIAMETERS. HEAD RESISTANCE.

THE HIGHEST QUALITY MATERIAL IS USED IN THESE CORDS AND EVERY COMPLETE CORD IS TESTED AT OUR WORKS AND CERTIFICATE OF ACTUAL BREAKING STRESS SUPPLIED TO EACH CUSTOMER.

RESULTS OF A SERIES OF TESTS MADE BY MESSRS. DAVID KIRKALDY & SON, LONDON.

ELONGATION:—

1. AT HALF BREAKING LOAD, NEVER EXCEEDED 0·6%
2. AT BREAKING LOAD ... ... MINIMUM 0·1%
   MAXIMUM 3·0%

BULLIVANTS'

Table of Flexible Plough Steel Wire Stranded Cords Tinned for Bracing, Controls, etc., for AIRCRAFT.

REFERENCE	CONSTRUCTION: NO. OF STRANDS	CONSTRUCTION: WIRES PER STRAND	SIZE: INCHES DIAR.	SIZE: INCHES CIRC.	SIZE: MILLIMETRES DIAR.	SIZE: MILLIMETRES CIRC.	APPROXIMATE BREAKING LOAD: LBS	APPROXIMATE BREAKING LOAD: KILOS	APPROXIMATE WEIGHTS: LBS PER 1000 FEET	APPROXIMATE WEIGHTS: KILOS PER 100 METRES
A	7	7	·068	3/16	1·7	5	500	227	8	1·2
B	7	7	·075	1/4	1·9	6	650	295	10	1·5
C	7	7	·088	9/32	2·2	7	1120	500	14	2·1
D	7	7	·099	5/16	2·5	8	1500	681	17	2·6
E	7	7	·110	11/32	2·8	9	1680	762	20	3·0
F	7	7	·115	23/64	2·9	9	1750	794	23	3·4
G	7	7	·130	25/64	3·3	10	2300	1043	30	4·5
H	7	7	·138	27/64	3·5	11	2450	1111	33	4·9
I	7	7	·140	7/16	3·6	11	2600	1179	36	5·3
J	7	7	·164	33/64	4·1	13	3600	1633	47	7·0
K	7	7	·180	37/64	4·6	15	4500	2041	55	8·2
L	7	7	·210	21/32	5·3	17	6300	2858	74	11·0
					EXTRA FLEXIBLE.					
M	7	12	·093	19/64	2·4	7	850	385	13	1·9
N	7	12	·105	5/16	2·7	8	1200	544	18	2·7
O	7	14	·115	11/32	2·9	9	1500	680	20	3·0
P	7	19	·126	13/32	3·2	10	2000	907	27	4·0
Q	7	19	·137	7/16	3·5	11	2450	1111	32	4·8
R	7	19	·150	1/2	3·8	12	2900	1315	38	5·7
S	7	19	·168	9/16	4·3	14	3400	1542	50	7·4
T	7	19	·182	19/32	4·6	15	4200	1905	56	8·3
U	7	19	·195	5/8	5·0	16	5000	2268	64	9·5
V	7	19	·218	11/16	5·5	17	5500	2495	80	11·9
W	7	19	·228	23/32	5·8	18	6250	2835	90	13·4
X	7	19	·239	3/4	6·1	19	7250	3288	100	14·9
Y	7	19	·262	13/16	6·7	21	8500	3855	117	17·4
Z	7	19	·270	27/32	6·9	22	9600	4356	124	18·4
Z.1.	7	19	·305	1	7·7	25	11000	4990	151	22·5

Regd. Offices: 72, MARK LANE, LONDON, E.C.

Works: MILLWALL, LONDON, E.

Telegraphic Address: "BULLIVANTS, FEN, LONDON."

2561
XIV
223

Published Annually.

ALL THE WORLD'S AIR=CRAFT.

(ORIGINALLY KNOWN AS "ALL THE WORLD'S AIRSHIPS.")

(WAR FLYING ANNUAL.)

FOUNDED AND EDITED BY

FRED T. JANE,

FOUNDER AND EDITOR OF "FIGHTING SHIPS" (ANNUAL), ETC.

109548
ac

PART A.—AEROPLANES AND DIRIGIBLES OF THE WORLD.
PART B.—HISTORICAL AEROPLANES OF THE LAST SIX YEARS.
PART C.—THE WORLD'S AERIAL ENGINES.
PART D.—AERIAL DIRECTORY.

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

SIXTH YEAR OF ISSUE.

(FOUNDED 1909.)

LONDON:

SAMPSON LOW, MARSTON & CO., LTD.

1914.

TB. d-37

PRINTED BY NETHERWOOD, DALTON & CO., PHŒNIX WORKS, RASTRICK, HUDDERSFIELD.

O
629.1331
Jan/All
10 9548

The Addenda will be found at end of the American pages. Addenda pages in full, delete everything in body of the book.

The American pages of this edition have been revised to date.

CONTENTS.

	PAGE.
PREFACE	7
GLOSSARY OF TECHNICAL TERMS...	9

PART A.

ALBANIA	15
ARGENTINE **(J. Schiere)**	16
AUSTRIAN **(Special Austrian Editor)**	17
Aeroplanes	19
Dirigibles	20
BELGIAN	21
Aeroplanes	22
Dirigibles	23
BRAZILIAN	25
BRITISH	26
Aeroplanes	33
Dirigibles	53
BRITISH COLONIES, ETC.	57
BULGARIAN	60
CENTRAL AMERICAN REPUBLICS	61
CHILIAN	62
CHINESE	63
DANISH	64
DUTCH **(J. Schiere)**	65
FRENCH **(Alexander Dumas)**	67
Aeroplanes	75
Dirigibles	95
GERMAN **(Special German Editor)**	111
Aeroplanes	117
Dirigibles	137
GREEK	150
ITALIAN **(Special Italian Editor)**	151
Aeroplanes	154
Dirigibles	158
JAPANESE **(Partly Official)**	161
Dirigibles	163

	PAGE.
MEXICAN	164
NORWEGIAN	165
PERUVIAN	166
PORTUGUESE	167
ROUMANIAN	168
RUSSIAN	169
Aeroplanes	171
Dirigibles	172
SERVIAN	174
SIAMESE	175
SPANISH	176
Dirigibles	178
SWEDISH	179
SWISS (**Special Swiss Editor**)	181
TURKISH	183
URUGUAY	184
UNITED STATES	185
Aeroplanes	191
Dirigibles	204

PART B.

	PAGE.
HISTORICAL AEROPLANES	1B *et seq*

PART C.

PRINCIPAL AEROPLANE ENGINES	1C
Austrian	2C
British	3C
French	5C
German	7C
Italian	9C
U.S.A.	11C

PART D.

CLASSIFIED AERIAL DIRECTORY	1D
ALPHABETICAL INDEX—AEROPLANES	*end of book*
„ „ DIRIGIBLES	*end of book*

SPECIAL NOTE.

On account of the general European War it has been decided to publish the first edition of this book a month earlier than was originally anticipated. This means that the Italian and United States pages have to go to press imperfectly brought to date. On the other hand, though certain details which would otherwise have appeared are necessarily lacking, the matter collected concerning the principal belligerents is of such a nature that immediate publication seems desirable and to justify the unfinished state of the British pages, from which, for obvious reasons, a good deal has been deliberately deleted.—F. T. J.

PREFACE.

LIKE all its predecessors, this edition—although it is the sixth year of issue—remains in the transition stage. Everything having to do with aviation is in a similar state, and the book must necessarily represent that state of affairs.

Quite a common criticism is that despite the progress of aviation the book grows thinner year by year. This is true enough: but there is an obvious reason. Constructors a few years ago were legion. To-day they have thinned out on "survival of the fittest" lines.

The survivors are not very many, despite a certain number of recruits. To which must be added the fact that—except as a war machine—neither the aeroplane nor the dirigible has any immediate utility at the present time. There is still a certain number of civilian pilots; but practically all of them can be placed in either one of two groups:—(1) Demonstrators of machines or (2) the majority—folk who have secured pilot certificates for the fun of the thing, and of whom a certain small number might eventually be made useful in case of war, but most of whom have for the present lost interest in the practical side of the subject. Beyond that "private aviation" has at present no *locus standi* whatever.

Co-existent with the disappearance of many little firms financing more or less hair-brained inventors is the arrival of big shipbuilding firms in the constructional field. It is a curious fact—which a few years hence may lead to comment—that such "adventurers" are almost invariably British firms. From which it may be premised that—incredible as it may sound—the British are the only people who, as yet, have taken aviation really seriously. In regarding aviation as a commercial asset, we are far behind; but from the point of "war utility" there is a good deal of reason to suppose that our lead is more real than apparent.

The usual reproach against the British is that they have never accepted the aeroplane as on all fours with the motor car, and that the public generally has ever preferred a football match to "aeroplane stunts." All of which so-called inanition is probably entirely to the good! A purely commercial or sporting future may perhaps exist for aircraft; but at present it is a long way off. For all practical purposes aircraft have no more to do with peace than have

submarines. Their first and (at the present time) last utility is WAR. In this book they are regarded solely from that standpoint.

Relating once more to the slimness of this book in relation to its price, I may perhaps be forgiven for stating that it has entailed a heavy financial loss ever since its first production. Dirigibles, it is true, endure: but so far as aeroplanes are concerned, every fresh issue has entailed the scrapping of whatever may have appeared in the previous year, and the cost of production has been in proportion, and this despite the fact that the book has "official recognition" almost as catholic as that accorded to "*Fighting Ships.*"

In even having started this book, away back in 1909, I suppose that I was ten years "too previous." However, it was started and so it has to continue. No expense has been spared to make the present edition as accurate as such an everchanging theme admits.

Mention may be made of the fact that the Aviation "Who's Who" has been omitted from the present issue. It seemed to fill no useful purpose. It was under contemplation to replace it by somewhat similar matter dealing entirely with naval and military aviation, but a variety of circumstances have prevented its inclusion in the current edition.

In conclusion, I desire to express my grateful thanks to all those who have so kindly assisted and collaborated with me in various ways.

FRED T. JANE.

Bedhampton,
Hants,
England.

GLOSSARY OF TECHNICAL TERMS, Etc.

ENGLISH.	DUTCH.	FRENCH.	GERMAN.	ITALIAN.	NOTES.
Abaft	Achterste deel	Arrière	Hinter	A poppa	
Accessories	Onderdeelen	Accessoires	Zubehör	Accessori	
Accumulator	Accumulator	Accumulateur	Akkumulator	Accumulatore	
AEROPLANE	Dekvlieger	Aéroplane	Drachenflieger	Aeroplano	
Aeronant	Luchtvaarder	Aéronaute : Aviateur :	Luftschiffer	Aeronauta	
Aerostat	Luchtbal	Aérostat	Freiballon	Aerostato	
Aft	Achterdeel	Arrière	Hinten	Addietro	
After (rear)	Achter	Arrière	Hinterer	Poppa	
Air-cooled	Luchtgekoeld	Refroidit par l'air	Luftgekuhlt	Raffredda ad aria	
Angleiron	Hoekyzer	Cornière	Eck Schiene	Ferro ad angolo	
Anti-friction metal	Wit metaal	Métal anti friction ou regule	Lagermetall	Metallo bianco (anti frizione)	
Aviation	Vliegtechniek	Aviation	Flugtechnik	Aviazione	
Babbit Metal	Babbits metaal	Métal Babbitt ou regule	Lagermetall	Metallo Babbitt	
Balance	Evenwicht	Equilibre	Gleichgewicht	Equilibrio	
Ball bearings	Kogellagers	Coussinets à billes	Kugel Lager	Cuscinetti a sfero	
Ballonet	Luchtzak	Ballonet	Ballonet	Palloncino compensatore	
Battery	Battery	Batterie	Batterie	Pila a secco	
Bearing metal	Kussenmetaal	Métal pour les coussinets ou regule	Lager metall	Metallo par cuscinette	
Behind	Achter	Derrière	Hinter	Di dietro	
Bevel geared	Kegelraderwerk	Engrenage Conique	Konischer Antrieb	Ingranaggio conico	
Biplane	Tweedekker	Biplan	Zwei decker	Biplano	
Bladen (of propeller)	Bladen (der schroef)	Pales	Flügel	Pale dell'elica	
Body	Romp	Fuselage	Körper	Telaio o chassis	
Bolt	Bout	Boulon	Bolzen	Bollone	
Box-kite	Kabel-vlieger	Cerf-volant	Drachen	Aquilone a celle	
Bracket	Klamp	Tasseau	Stütze	Sostegno	
Brake	Rem	Frein	Bremse	Freno	
Breadth	Breedte	Largeur	Breite	Larghezza	
Canvas	Doek	Toile	Leinwand	Tela	
Car	Gondel	Nacelle	Gondel	Navicella	
Carburetter	Vergasser	Carburateur	Vergaser	Carburatore	
Casting	Gietstuk	Moulage	Guss Stück	Getto	
Centre of Gravity	Zwaartepunt	Centre de Gravité	Schwerpunkt	Centro di gravità	
Chain driven	Door ketting gedreven	Transmission par chaine	Ketten antrieb	Trasmissione a catena	
Chassis	Gestel	Chassis	Motor Rahmen	Chassis	
Circumference	Omtrek	Circonférance	Umfang	Circonferenza	
Clutch	Haak	Embrayage	Kupplung	Innesto	
Connection	Schakeling	Couplage	Kupplung	Connessione	
Control	Stuurinrichting	Direction	Lenk Übersetsung	Meccanismo di direzione	
Coupled	Gekoppeld	Jumelé	Paarweise	Accoppiato	
Crank shaft	Krukas	Arbre à manivelle	Kurbelwelle	Albero delle manovelle	
Cylinder	Cylinder	Cylindre	Zylinder	Cilindro	
Die cast Bearings	Ondermetaallager	Coussinets montés encoginilles	Schalenguss Lager	Cuscinette fusi in conchiglia	
DIRIGIBLE	Motorballon	Dirigeable : Aéronat	Motorluftschiff	Dirigibile	
Diameter	Middellyn	Diamètre	Durchmesser	Diametro	
Direct driven	Direct gekoppeld	Prise directe	Direkter Antrieb	Presa diretta	

GLOSSARY OF TECHNICAL TERMS, Etc.

ENGLISH.	DUTCH.	FRENCH.	GERMAN.	ITALIAN.	NOTES.
Electric welding	Electrische Lasching	Soudure électrique	Elektrisches Schweissen	Soldatura elettrica	
Elevator (horizontal rudder)	Hoogtestuur	Gouvernail de profondeur	Hohensteuer	Timone orizzontale	
Engine	Motor	Moteur	Motor	Motore	
Fan	Ventilator	Ventilateur	Ventilator	Ventilatore	
Fittings	Fittings	Garniture	Garnitur	Armamento	
Flight	Vlucht	Vol	Flug	Volo	
Flown	Gevlogen	Volé	Geflogen	Volato	
Fore	Voor	Avant	Vorderer	Davanti	
Forward (in front)	Van Voren	En avant	Vor	Davanti	
Frame	Romp	Fuselage	Rahm	Telaio	
Framework	Geraamte		Gerüste	Intelaiatura	
Gas bag	Gaszak	Enveloppe	Luftballon (Hülle)	Involucro	
Geared to	Vertand	Multiplié à	Übersetst auf	Moltiplicato a	
Gear driven	Met tandradoverbrenging		durch Zahnrädern getrieben	Trasmissione a ingranaggi	
Girder	Balk	Poutre	Balken	Longarine	
Glider	Glydvlieger	Planeur	Gleitflieger	Apparecchio a planare	
Gondola	Gondel	Nacelle	Gondel	Navicella	
Helices	Schroeven	Helices	Schrauben	Eliché	
Helicopter	Schroefvlieger	Helicoptère	Schraubenflieger	Elicoplano Elicottero	
Horizontal plane (in a)	Horizontaalvlak (in een)	Plan horizontal	Horizontal fläche	Piano orizzontale	
Horse power	Paardekracht	Puissance en chevaux	Pferdekraft	Forza cavalli	
Hydrogen	Waterstof	Hydrogène	Wasserstoff	Idrogeno	
Ignition	Ontsteking	Allumage	Zündung	Accensione	
Inch	Duim	25·39 m/m.	25·39 m/m	Pollice = 25·39 m/m.	
Inclination	Helling	Inclination	Schrägstellung	Inclinazione	
Keel	Kiel	Carène	Kiel	Chiglia	
K.P.M. (kilometres per hour)	K.P.U. (kilom. per uur)	Kilometres par heure	Kilometre pro Stunde	Chilometre all'ora	
Kite	Vlieger	Cerf volant	Drachen	Aquilone	
Length	Lengte	Longueur	Länge	Lunghezza	
Lining metal	Lagermetaal	Métal pour garnir les coussinets ou régule	Lagermetall	Metallo per bronzine dei cuscinetti	
Lower (planes)	Onder (vlakken)	Inférieur (plans)	Untere Flächen	Piani inferiori	

GLOSSARY OF TECHNICAL TERMS, Etc.

ENGLISH.	DUTCH.	FRENCH.	GERMAN.	ITALIAN.	NOTES.
Magneto	Magneet	Magneto	Magnet	Magneto	
Maximum	Maximum	Maximum	Maximum	Massimo	
Middle (plane)	Midden (vlak)	(Plan) au milieu	Mittel Deck	Piano medio	
Mile	Myl	Mile	Meile	Miglio	
Military	Militair	Militaire	Militärische	Militare	
Miscellaneous	Verschillend (allerlei)	General	Verschiedenes	Diversi	
Monoplane	Eendekker	Monoplan	Ein decker	Monoplano	
Motor	Motor	Moteur	Motore	Motore	
M.P.H. (miles per hour)	M.P.U. (myl per uur)	Vitesse	M.P.S.	Miglia all'ora	
Multiplane	Veeldekker	Multiplan	Vieldecker	Multiplano	
Nacelle	Schuitje	Nacelle	Gondel	Navicella	
Non-rigid	Slap	Souple	Unstarr	Non-rigido—flessibile	
Petrol (gasoline)	Benzine	Essence	Benzin	Benzina	
Pilot (driver)	Bestuurder	Flyer: Aviateur	Führer	Aviatore	
Pivot	Tap	Pivot	Gewinde Zapfen	Perno	
Planes	Vlakken	Plans	Flächen	Piani	
Plug	Kaars, stop	Bougie	Zünd Kerze	Candela	
Pound (lb.)	Eng pond = 0,453 K.G.	0·453 kg.	0·453 kg.	Libbra = 0·453 kg.	
Pressure	Druk	Pression	Druck	Pressione	
Propeller	Schroef	Helice	Schraube	Eliche	
Quadruplane	Vierdekker	Quadruplan	Vier decker	Quadruplani	
Quintuplane	Vyfdekker	Quintuplan	Fünf decker	Quintuplani	
Radiator	Koeler	Radiateur	Kühler	Radiatore	
Rear (in)	Achterkant (aan de)	En arrière	Hinten	Indietro	
Reduction gearing	Reductie-overbrenging	Engrenage de demultiplication	Übersetzung	Ingranaggi di riduzione	
R.P.M. (revolutions per minute)	Omw. per minuut	Tours	Umlauf	Giri al minuto	
Rigid	Styf	Rigide	Starr	Rigido	
Rises	Stygt	S'elève	Hebt sich	Si eleva	
Rubber	Gummi	Caoutchouc	Gummi	Gomma	
Rudder	Roer, Stuur	Gouvernail	Steuer	Timone	
Section	Doorsnede	Section	Durchschnitt	Regione	
Semi-rigid	Halfstyf	Demi-rigide	Halb Starr	Semi-rigido	

GLOSSARY OF TECHNICAL TERMS, Etc.

ENGLISH.	DUTCH.	FRENCH.	GERMAN.	ITALIAN.	NOTES.
Span	Spanwydte	Envergure	Spannweite	Apertura	
Speed	Snelheid	Vitesse	Geschwindigkeit	Velocita	
Stability	Evenwicht	Stabilité	Gleichgewicht	Stabilità	
Stabilising fins	Evenwichtsvlakken	Ailerons	Gleichgewichtsflächen	Piani stabilizzatori	
Steel	Staal	Acier	Stahl	Acciaio	
Steering Gear	Stuurtoestel	Direction	Steuerung	Meccanismo di direzione	
Steering Wheel	Stuurwiel	Volant	Steuerrad	Volante di direzione	
Supporting surface	Draagvlak	Surface	Tragfläche	Superficie di sostegno	
Surfaces	Oppervlakken	Surfaces	Flächen	Superfici	
Suspension	Ophanging	Suspension	Aufhängung	Sospensioni	
Switch	Omschakelaar	Interrupteur	Schalter	Interruttore	
Tail	Staart	Queu	Schwanz	Coda	
Total weight	Totaal gewicht	Poids totale	Gesamtlast	Peso totale	
Transmission Shaft	Overbrengingsas	Arbre de transmission	Transmissions Welle	Albero di trasmissione	
Trial	Proef	Essai	Probe	Prova	
Triplane	Driedekker	Triplan	Drei decker	Triplano	
Universal Joint	Kogelgewricht	Joint universel	Kardan	Guinta universale	
Unladen	Onbelast, leeg	à vide	Leerlaufend		
Upper (planes)	Boven (vlakken)	Supérieur	Obere	Piani superiori	
Useful lift	Nuttige last	Poids utile	Nutzlast	Forza utile di elevazione	
Valve	Klep	Soupape	Ventil	Valvola	
Vertical plane (in the)	Vertikaal vlak (in het)	Plan vertical	(in der) Vertikalfläche	Nel piano verticale	
Vertical rudder	Zystuur	Gouvernail vertical	Seitensteuer	Timone verticale	
Volume	Inhoud	Volume	Inhalt	Volume	
Water-cooled	Watergekoeld	Refroidissement par eau	Wasserkühlung	Raffreddata ad acqua	
Weight	Gewicht	Poids	Gewicht	Peso	
Wheels	Wielen	Roues	Raeder	Ruote	
Wings	Vleugels	Ailes	Flügel	Ali	
Wood	Hout	Bois	Holz	Legno	
Yard (measure)	Yard (maat) = 0,914 M	0·914 mètres	0·914 meter	Jarda = 0·914 m.	

AEROPLANES & DIRIGIBLES.

ARRANGED BY NATIONALITIES IN ALPHABETICAL ORDER.

Note.—Every nation is given in the following fixed order:—

List of Aerial Societies and Clubs, with addresses and Secretaries where possible.
List of Aerial Journals, with addresses, price, and dates of publication.
List of Flying Grounds for aeroplanes, and hangars for dirigibles (if any).
List of Military and Naval Machines and aviators.
List of Private Aviators, total of machines, etc.
AEROPLANES in alphabetical order, photos, plans, and particulars.
DIRIGIBLES: Military and private " " "

ALBANIA.

Early in 1914 orders were placed for 3 *Lohner-Daimler* aeroplanes, with a view to the formation of a flying corps.

ARGENTINE.

(Revised by J. SCHIERE, Aeronautical Engineer and Librarian, Dutch R. Ae. C.)

Aerial Societies:—

Ae. C., Argentino, 561, S. Martin, Buenos Ayres.

Aerial Journals:—

Boletin del Ae. C., Argentino (Monthly).

Flying Grounds:—

Aerodromo Villa Lugano. (P. Castabert, Director.)
Aerodromo del Palomar. (Military).
Retino. (Military.)

Military Aviation.

The Argentine Government decided in 1912 in collaboration with the Aero Club, Argentino, to establish a military flying school and balloon school on a sound base.

First of all, the military school at Palomar was established and several pilots were formed, while the ground at Villa Lugano was used for balloons. It was hoped to have at the end of 1914 a perfectly organised military aviation service.

Unfortunately, however, several fatal accidents occurred during the last year, the most tragic being the death of George Newberry, the President of the Aero Club, Argentino, in a *Morane* monoplane. Machines used:—*Blériot, Farman, Rumpler, Morane.*

Military Pilots.

Agnetta, Lieut. A.
Escola, Lieut. M. L.
Goulsat, Lieut. R. E.
†Origone, Lieut. M. F.

Private Aviators.

†Arseno, J. M. P.
Both, J. A.
de Bruyn, A.
England, G. E. C.
†Euselbione, L.
†Fels, T.
Goffre, C. A.
Foel, C.
Madeins, A. R.
†Newberry, J.
Parravicini, F.
Roth, Dr. J. A.

† killed.

AUSTRO-HUNGARIAN.

(By our Austrian Editor.)

Aerial Societies:—

Cesky Club Automobilistu. Aviatische Sektion. (Prague.)
Deutscher Luftfahrt-Verein in Boehmen (Teplitz-Schoenau).
Flugtechnischer Verein für Mähren (Brunn.).
Flugtechnischer Verein in Schlesien (Troppau).
Flugtechnischer Verein in Steiermark (Graz, Schmiedgasse 31).
K. k. Oesterreichischer Flugtechnischer Verein (Wienstrasse 31, Vienna).
Kärtner Automobil Club (Klagenfürt.)
Klub Awiata (Obertynska Str. 8, Lemburg, Galicia).
Magyar Automobil Club (Budapest).
Oberösterreichischer Verein f. L. in Linz (Landstr. 119, Linz).
K. k. Oesterreichischer Aero Club (St. Annahoff, Vienna,) *(formerly Wiener Aero Club).*
Oesterreichischer Flugsport Club (Breitegasse 7, Vienna VII).
Oesterreichischer Luftflotten-Verein (Vienna).
Verein für L. in Tirol (Innsbruck).
„ „ „ Stiermark (Graz).

Aerial Journals:—

Allgemeine Sport Zeitung. (St. Annhoff, Vienna) weekly.
H.P. Fachzeitung für Automobilismus und Flugtechnik. (Vienna) weekly.
Oesterreichische Flugzeitschrift (Aspernplatz, Wien I) fortnightly.
Wiener Luftschiffer-Zeitung. (St. Annahof, Vienna) fortnightly.

Flying Grounds:—

Military.

Fischamend (Principal Army).
Goerz.
Ujoidek, Hungary.
Zaule b. Triest.

Naval.

Pola.

Private.

Aspern bei Wien. Vienna.
Mostar.
Rakos bei Budapest.
Wiener Neustadt.

AUSTRO-HUNGARIAN AEROPLANES.

Military Aviation: General.

In June, 1912, a central aeronautical committee was created, under the presidency of Prince Fürstenberg, to deal with the creation of a national aerial fleet. One of the objects is the perfection of the Austrian machines and factories.

In July, 1913, it was proposed to acquire six *Zeppelins*, to be stationed respectively at Vienna, Budapest, Innsbruck, Prage, Lemberg and Sarjevo.

In February, 1914, the military aviation corps was reorganised and formed into a battalion of four companies stationed at Vienna, Cracow, Sarjevo and Goerz.

Lieut. Ellsner killed, 1914.

In March, 1914, a prize of 12,000 kroner offered by the Minister of War as follows:—Armed two-seater, gun to have arc of fire 120 degrees, 30 degrees elevation and 60 degrees depression. Useful load 1764 lbs. (800 kg.). Minimum climb 6,500 ft. (2,000 m.) in 45 minutes from times of starting to alight in ploughed field.

A prize of 13,000 kroner for the machine with the best speed variation.

June, 1914, dirigible *Koerting (M 3)* wrecked by collision with an aeroplane. All killed in both

Army Section.

At end of March, 1913, there were:—

60 monoplanes.—*Illeriot, Nieuport, Etrich-Taube, Albatros, Lohner-Daimler.*

40 biplanes.—*Lohner-Daimler* and *Albatros.*

Naval Section.

A few seaplanes.

Military Pilots.

† = Killed.

To March, 1913.

†Buckta, Lieut.
Busfield, Ob. Lieut.
Blaschke, v. Ob. Lieut.
Eyb, Ob. Lieut.
Flassig, Lieut.
†Flatz, Lieut.
Holeka, Ob. Lieut.
Kenese, Ob. Lieut.
Klobucar, Ob. Lieut.
Miller, Ob. Lieut. (5)
Oelwein, Ob. Lieut.
Perini, Lieut.
Petrocy, Haupt. von.
Riedlinger, Ob. Lieut.von.
Schimdler, Lieut.
Schinzel, Lieut.
Stolanzl, Ob. Lieut K (14)
Umlauff, Major von. (10)
Uzelac, Ob. Lieut.
Venczel, Lieut.
Welhelm, Ob. Lieut. von

Added to end of March, 1914.

Babocsek, F.
Cejnek J.
Cerri, K.
Ciszek B.
Deutelmoser, F.
Fekete, O.
Fiedler, P.
Flatz, E.
Gefink, J.
Georgievic, M.
Hubner, R
Huppner, K.
Huss, H.
Illicher, J.
Kahlen, E.
Kaindl, A.
Kaiserfeld, R. von
Kazu, E.
Kiraly, K.
Klasing, G
Klimitsch, K.
Korber, J.
Kosanovic
Lettis, A.
Libowitzki, A.
Loncarcy, B. von
Maglic, K
Maturanic, B.
Mikulecsky, F.
Moltini, R.
Nemec, H. E. von
Ocklermüller, H.
Oswald, R.
Perini, M.
Petrovics, A. von gest.
Prebanda, G.
Rozenemowsky, von T. E
Sabeditsch, K.
Sanchez, de la G. A.
Schartner, H.
Stoestanz, J.
Sznicka, F.
Sobar, J. von
Steiner, G. E. von A. E
Steinfl, N
Szczesny, K.
Stiasny, O.
Tawozig, A.
Teufl, von F. R.
Varga, J.
Walfi G.
Wiktorin, H. von
Wilhelm, E. von H., K.
Wosecek, W.
Ziekero, L.

The military centre is at Goerz, the naval one at Pola.

Flying officers receive each a grant of 1,600 crowns; also 15 crowns a month for upkeep. Special certificate brings 2,000 crowns extra grant.

Private Qualified Aviators.

* = Superior brevet. † = Killed.

To March, 1913.

Auer, J. (6)
Baar, R.
Babonese, K.
Banfield, K.
Bauer, Dr. V. R. von.
Bernat, M.
*Brier, H. (18)
Blaschke von. Z.R.
Boonis, W. (9)
Bratmann, J.
Buchsätter, A.
Cejnek, J.
Cihak, E.
Ciszek, J.
Czernak, J.
Dworak, W.
*Economo, C. F. von. (7)
Fiedler, P. (19)
*Flesch, J. (11)
Friedmann, W.
Haner, E.
Hesse, M.
Heyrowski, A.
Hieronimus, O.
Hinter, K.
Hold, Hermann
Huss, H.
*Illner, K.
Javor, J.
Kaiserfeld, R. von.
Kasulakow, W.
Keck, Z.
Kenese, W.
Kiraly, K.
Klobucar, V.
Knirsch, A.
Kolowrat, A. Graf. (15)
Kreiner, E.
Lagler, B. V.
Latzel, J.
Lettis, A.
Libowitzky, A
Mandl.
Mazuranic, B.
†Mosca,
Nemec, H. E. von.
Nittner, E.
Ockermüller, H.
†Petrovics, A. von. (13)
Pischof, A. R. von. (2)
Rabis, M.
Reisner, H.
Riedlinger, E. v. Kastreuberg.
Rosenthal, F.
†Russjan.
Sablatnig, J. (12)
Schartner, H.
Schindler, A.
Schonowsky, B.
Schönpflug, F.
Seidl, Franz.
Simcos, R. (4)
Stanger, R.
Steiner-Gold, E. v. A.
Stiploschek, M.
*Szekely, M.
Tansaig, K.
Teufl von. Ferland, R.
Umlauff von F.
Vlaicu, A.
*Warchalowski, A. (1)
Warchalowski, K. (8)
Weiner, T.
Widmer, J.
†Wiesenbach, V.
Wosecek, W.

Added up to end of March, 1914.

Alexay, A.
Andrich, D. gest.
Böhm, A.
Bulimbacic, I.
Cavaliar Ritter von G., F.
Casto, J.
Dudic, O. gest.
Eby, R.
Eisner, E. gest.
Facchini, E.
Fesl, A.
Fiala, O. von
Hauer, E.
Holeka, R.
Huber, K.
Knirsch, A.
Konschel, F.
Kuntner, F.
Lehmann, G. E. von
Libano, L.
Miller, M
Oelwein, E.
Pendhayn, J. P.
Petric, W.
Pitschmann, R. K.
Plamk, M.
Reiterer, F.
Renner, A.
Sattler, F.
Schmoczer von Mec., O
Schinzel, V.
Schuster, R.
Schwab, H.
Schwarz, R.
Sparmann, E.
Stojsavljevic, R.
Wagner, E. von F., N.
Wittmann, V.

Private Aeroplanes.

The total number of private aeroplanes in the country is about twenty.

LOHNER-DAIMLER. This firm is now amalgamated with Etrich. Capacity: 100-120 machines per year.

Model 1912-13. (Many of these still in use).

	1912-13. **Lohner** Daimler Pfeilflieger.	1913-14. **"Parasol"** Monoplane.
Length ... ... feet (m.)	32 *9·70*	26½ *8*
Span ... ... feet (m.)	44½ *13·50*	32¾ *10*
Area ... . sq. feet (m²).	450 *42*	220 *20*
Weight (total ... lbs. (kgs.)	920 *420*	1719 *780*
Weight (useful lbs. (kgs.)	...	882 *400*
Motor... ... ... h.p.	125 Aust. Daimler	125 Aust. Daimler
Speed .. ... m.p.h. (km.)	62 *100*	*Ca.* 71 *115*
Number built during 1913 ...	60	12

Biplane.

Monoplane

(Under Foreign License.)

ALBATROS. Vienna. Branch of the German firm.

LLOYD'S AIRCRAFT Co. Budapest. Build *D.F.W.'s* (German) under license.

WHITEHEAD. Whitehead & Co., Fiume, Austria. The Whitehead Torpedo Co. has laid down plant for the production of hydro-aeroplanes.

AUSTRO-HUNGARIAN DIRIGIBLES.

Military.

Date of order.	Name.	Make.	Type.	Capacity in m³.	H.P.	Speed. m.p.h. (k.p.h.)	Remarks
1913	**M 4**	Zeppelin	r.	22,000	450	47 75	*Building*
?	*5 projected*	„	r.				

Three have been destroyed.

Military Dirigible Pilots.

(† = Killed.)

†Brener
Cajanek, V.
Grebenz, K.
†Haidinger
†Hauswirth, J.
Heller, S.
†Hofstätter, E.
Macher, M.
Tauber, F.
Tepser, G. E. von.
Weiss, H.

Private.

None existing at present.

Four have come to grief.

Private Dirigible Pilots.

Adrario, K.
Baumann, F.
Becker, T.
Berlepsch, F. F. von.
Cassinone, A.
Fürst, A.
Hoffory, W.
Hinterstoisser, F.
Kaiser, K.
Mannsbarth, F.
Nowy, V.
Richter, von. B.
Stagel, H.
Stratmann, W.
Wagner, E. von. F.
Zborowski, J.

BELGIAN.

(Revised by M. BRACKE, Aeronautical Engineer & Editor of "L'Aero Mécanique.")

Aerial Societies:—

Aero Club Belgique.
Aero Club of Hainault.
La Ligue Nationale Belgique.
Delta Club (Kites).
Ae. C. de Flanders.
Ae. C. du Littoral.
Ae. C. de Liege-Spa.

Aerial Journals:—

La Conquête de l'Air. (214 Rue Royale, Brussels) bi-monthly, 5 francs p. a.
L'Aero Mécanique (Brussels edition). Chemin de St. Denis, Casteau, Mons., Belgium, 2·50 *l.*
L'Aviation Industrielle et Commerciale (monthly), Chemin de St. Denis, Casteau, Mons., 1·50 *l.*

Flying Grounds:—

Berchem.
Brasschaet (Military).
Camp de Casteau. (Aviation Industrielle & Commerciale).
Etterbeek, near Brussels.
Kiewit.
St. Job (private property Baron de Caters.).

BELGIAN AEROPLANES.

Military Aeroplanes.

At the end of 1913 the military air force consisted of twenty-four 80 h.p. Gnome *H. Farman*, also various old school machines.

The military school is at Brasschaet, near Antwerp.

The course is as follows:

1. *Theoretical course.*—Lectures on meteorology, structure of aeroplanes, aviation motors, etc.

2. *Practical.*—This, in addition to flight, consists of dismounting and replacing parts of aeroplanes and aerial motors, all general repairs, erecting hangars and aerial photography.

The school possesses nine hangars, of which three are Bessonneau type, three wooden, and three metal.

For 1913 the sum of £20,000 is to be expended for purchase of aeroplanes and the establishment of aerial squadrons at Antwerp, Liege, and Brasschaet.

These are organised into six squadrons of four units each. The full complement of each squadron is eight aviators, fifteen to 20 mechanics, etc., and six citizen soldiers.

The question of hydro-avions for the Congo is under consideration.

Aeroplane Factories.

BOLLEKENS. Build *Farman's* under license.

AVIATORS.

(The number against any name is, unless otherwise stated, the Ae. C. Belgique pilot certificate number.)

Military.

Broune, Lieut. (37)
Cozic, R. (23)
Dhanis, Lieut. (35)
Heinter Poorten (47)
Lebon, Lieut. (36)
Moulin, E. (45)
Mortens, Lieut. (19)
Nelis, Lieut. (in command) (28)
Robert, V. (17)
Sarteel, Lieut. (26)
Sournoy, J. (46)
Tocy, Lieut.

To end of June, 1914.

Boonaert, Lieut.
Cousin, Lieut.
Crombez, H.
De Cartier, R. Officier
Daniel, S. Lieut.
Daumerie, B. Officier
De Baeger, A. Officier
De Burlet, S. Lieut.
Dechamps, F. Officier
Demanet, A. Officier
De Meerendre, S. Lieut.
Delfosse, S. Lieut.
Deschamps, Capt. (in command)
Dubeuger, Lieut.
Godefroy, Lieut.
Gods, S. Lieut.
Hagemans, J. Officier
Hubert, M. Officier
Hugon, Lieut.
Isserentant, F. Officier
Jacquet, S. Lieut.
Landrin, J. Officier
Lebrun, L. Officier
Legros, R. Officier
Liedel, F. Officier
Leid, Lieut.
Levesque, Lieut.
Louppe, S. Lieut.
Maswaix, A. Officier
Massonet, Lieut.
Mostenus, R. Officier
Moreau, Lieut.
Mourin, Lieut.
Noterman, F. Officier
Orlian, S. Lieut.
Petit, Lieut.
Post, L. Officier
Pierrot, Lieut.
Richard, P. Officier
Rochet, V. Officier
Schmit, A. Officier
Stellingwerff, J.
Tapponge, A. Lieut.
Van Loo, F.
Verhaegen, S. Lieut.
Wahis, T. (Ecuyer)

Private.

Allard, E. (4)
Armand, C. (22)
Baugniet, Edmond (18)
Camille, Amand (22)
Christiaens, Joseph (7)
Crombez (25)
De Caters, Baron (1)
De Heel, Emile (24)
D'Hespel, Comte Joseph (15)
De Laet, E. (31)
De Lamirne, Chev (9)
De Jonckeer (44)
Depireux, Isidore (20)
De Petrovsky, Alexandre (11)
De Ridder, Alphonse (13)
De Roy, W. (41)
Descommines
Deudemer, A. (43)
Dolphyn (40)
Doneryos, J. (33)
Dursy, A. (3)
Dutrieu, Mdlle. H. (27)
Fischer, Jules (12)
Frenay, Fernand (21)
Hanciau P. (34)
Hanedilleo, P. (42)
Lamblotte, F. (29)
Lasser, Alfred (16)
Lescart, F. (30)
Mestagh, G. (39)
Michez, S. R. (32)
Oleslagers, Jan (5)
Stellingwerff, J. (49)
Tyck, Jules (8)
Van den Born, Chas. (6)
Verschaeve, Fernand (17)
Verstraetes, Léon (14)

Up to end of June, 1914.

Castiau, R.
Cocymans, E.
Coyns, L.
Delhaye, M.
Demuyter, E.
Dendyver, A.
Pits, H.
Dony, J.
Dugniolle, A.
Taccoen, G.
Verlongen, B.

The following Belgian aviators have been killed:—

Kinet, Daniel (2)
Kinet, Nicolas (10)
Verrept, John (38)

BELGIAN DIRIGIBLES.

Military.

1910.

1. ***LA BELGIQUE II*** *(late I.*... ... ... 4,000 m³.

1911.

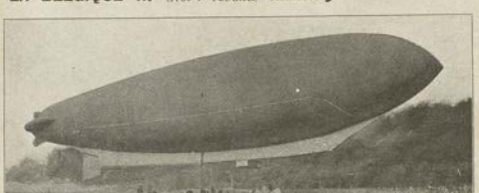
2. ***LA BELGIQUE III*** ... ...

Note.—La Belgique I was built in 1909 and re-built 1910.

Private.

VILLE DE BRUXELLES ... ... 6,000 m³.

LA BELGIQUE II. (*No. 1* rebuilt.) *Military.*



Length, 226 feet | 64·8 m. | **maximum diameter,** 35 feet | 10·75 m. | **capacity,** 141,300 cubic feet | 4,000 m³. | **total lift,** 9,921 lbs. | 4,500 kgs.

Gas bag.—Rubber proofed Continental fabric. Ballonet, filled by a separate motor giving 7·5 inches of water pressure. Warm air can be pumped in if required. Ballonet, 28,250 c. feet (800 m³.)

Motors.—2, each of 60 h.p., Vivinus, 4-cylinder, 112×170.

Propellers.—1 in front of the car. 285 revolutions per minute. Wood construction.

Speed.—25 miles per hour. 40 km. per hour.

Planes.—Horizontal: a gas tube bent horizontally round the tail.
Vertical: vertical fins on the tail, and a long vertical keel under the gas bag.

Car.—A girder, square in section, tapered at both ends. Built of tubular steel. Length, 82 feet (25 m.)

Miscellaneous.—Built by L. Godard, France, 1909. Crew, 3 men. Accommodation for 1 passenger. Fuel for 10 hours. Greatest height attainable, 3,280 feet | 1,000 m. |

Table of weights.—

	lbs.	kgs.
Gas bag, complete with ballonet, valves, planes, suspension, etc.	1,954	885
Propellers (2)	275½	125
Blower	33	15
3 h.p. motor for blower	33	15
Motors (2) complete with gearing and shafting	1,410	640
Car	992	450
Fuel for 10 hours	738	335
Ballast	826½	375
1 passenger (or ballast)	154	70
Crew (3)	463	210
Guide ropes, etc.	220	100
Miscellaneous	88	40
About	7,165	3,250

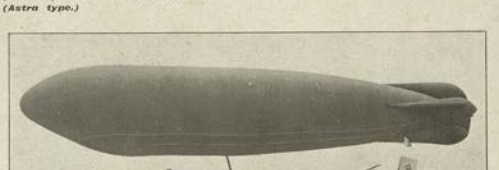
Remarks.—Reconstructed in the winter of 1909. There are two noteworthy innovations in connection with the ballonet. (1) The ballonet can be warmed by the motor. (2) In case of real emergency air can be pumped direct into the gas bag. Experiments of the utmost importance to all airships are in progress with a view to ridding the gas of this air cheaply and quickly.

LA BELGIQUE III. *Military.*

Presented 1910 to the Belgian Government by H.M. the King of the Belgians. 4,500 m³.
Practically same as *II*, but has 3 propellers. **Motors.**—Two 100 h.p. Germain.

VILLE DE BRUXELLES.

(Formerly known as LA FLANDRE.)
(Astra type.)



Maximum length, 256 feet | 78 m. | **maximum diameter,** 41 feet | 12·4 m. | **volume,** 212,000 c. feet | 6,000 m³. |

Total lift.—15,763 lbs. (7,150 kgs.) **Useful lift,** lbs. (kgs.)

Gas bags.—Continental rubbered fabric, yellow. Ballonet, 16,146 c. feet (1,500 m³.)

Motors.—2 Pipe motors of 100 h.p. each, placed in line with each other in the fore and aft line, and with clutches and the necessary gearing in between them.

Speed.—35 m.p.h.

Propellers.—3, namely: one at the fore end, driven by the two motors when coupled together, and two placed above and on either side of the centre of the car, for use when only one motor is running. Chauvière propellers.

Steering.—Vertical steering by means of a large double aeroplane fixed above the car, about a third from the front. Horizontal steering by means of a double vertical rudder above the rear end of the car. Stability is secured by the usual Astra pear shaped stabilising gas bags, with fins of rubbered cloth spread between the inner edges of these shapes.

Remarks.—The distinctive feature of this ship is the arrangement of the propellers. Both motors can be coupled either on to the front propeller or on to the two rear propellers, or on to all three together, but they are actually intended only to drive the front one. On stopping either motor the other is connected to the two rear propellers, which are designed for a slower speed of translation than the front one, with the result that the running motor does not find itself overloaded as it would if the same propeller had to serve both for one and for two motors.

BRAZILIAN.

At the end of 1913 a waterplane school was started at Rio de Janeiro and a 300 horse *Bossi* biplane ordered, fitted with wireless and bomb droppers. School established by Soc. Gino Bucelli & Co.

In June, 1914, looping the loop was suggested as a test for Army pilots.

Principal military aviator: Capt. Gino.

Military Aviation.

Early in 1914 there were **17** aeroplanes as follows:—

6 *H. Farman* (80).
2 *Borel* (80).
5 *Bleriot* (80).
1 *Pounier* mono.
3 *Bossi* biplanes.

BRITISH.

Aerial Societies:—

Royal Aero Club.
Aerial League.
Aeronautical Society. (Premier Society, founded 1866.)
Brooklands Aero Club.

There were once a great many local aero clubs, but the majority of these have ceased to exist and with one or two possible exceptions all the rest are moribund.

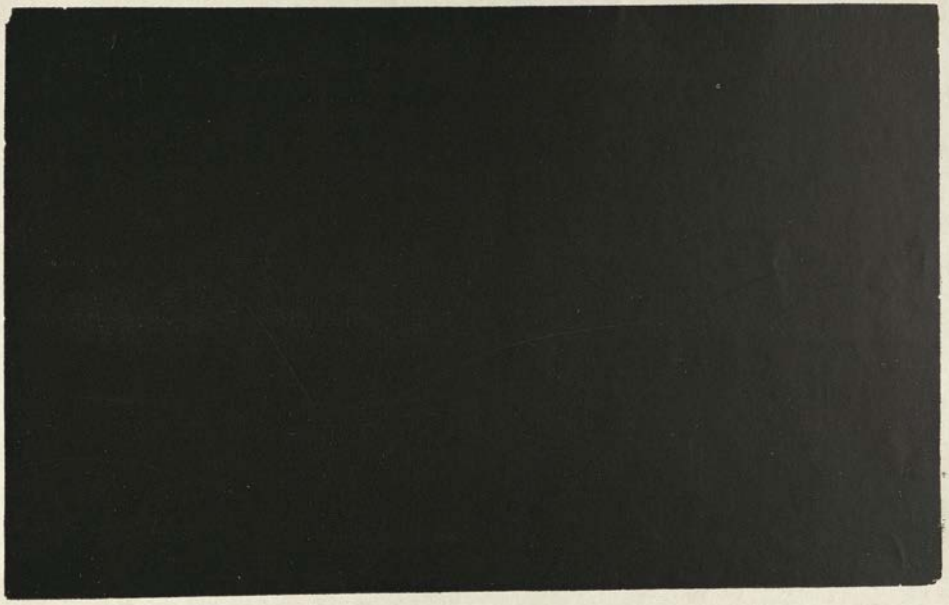
Aerial Journals, etc.:—

Aeronautical Journal. Quarterly. 53, Victoria St., London, S.W.
Aeronautics. 3d. monthly. 27, Chancery Lane, London, W.C.
The Aero. 6d. monthly. 20, Tudor St., London, E.C.
Flight. 3d. every Saturday. 44, St. Martins Lane, London, W.C. (Official organ of the R. Ae. C.)
The Aeroplane. 1d. weekly. 166, Piccadilly, London.
All the World's Aircraft. 21/-. Annual. 100, Southwark Street, London, S.E. and 5, Queen Victoria Street, London, E.C.

In addition, the *Car Illustrated* and the *Motor* devote considerable space to aerial matters.

Principal Flying Grounds:—

Aldershot.—Army school.
Brighton, Shoreham Aerodrome. Avro school. Pashley Bros. school.
Brooklands.—Bristol school. Vickers.
Camber Sands, Rye, Sussex.—At low tide moderately hard sand and soft places. Area two miles by one mile.
Dagenham (Aeronautical Society).
Dartford Marsh.—Vickers school.
Dunstall Park, Wolverhampton.
Eastbourne. Aerodrome School. Eastbourne Aviation Co.
Eastchurch, Sheppey.—(R. Ae. C.) 350 acres. Sheds. Members only. R. Naval school.
Filey.—Blackburn school.
Hendon.—Grahame-White, Blackburn, Bleriot, Caudron, Aircraft Co., Hall, Beatty schools.
Lanark.—Deperdussin school.
Liverpool (Melly school).
Llandudno & North Wales.—Aerodrome.
Mapplin Sands, Essex.—(Foulness). Very hard sand at low tide. Area ten miles by four miles. Property of War Office. Flying forbidden in winter.
Salisbury Plain.—Bristol school. Vast space available. Plenty of fairly smooth ground. Army school.
Shoreham.—(See Brighton).
Upavon.—Central flying school (*ex* R. Flying Corps.)



BRITISH MILITARY AVIATION.

Naval Wing Royal Flying Corps.

There is a special Air Department at the Admiralty with Captain M. F. Sueter, as Director, Wing Com. O. Schwann and Sq. Com. C. L'Estrange-Malone, as Assistants, Sq. Com. G. W. S. Aldwell, as Eng. Inspector.

Officers are graded Flying Officers, then Flight Commanders, thence to Squadron Commanders, etc.

Director of Air Department :
Sueter, Capt. M. F., C.B.

Wing Commanders :
Maitland, E. M.
Masterman, E. A. D.
Sampson, C. R.
Scarlett, F. R.
Schwann, O.
Usborne, N. F.

Squadron Commanders :
(E) Aldwell, G. W. S.
Boothby, F. M. L.
(E) Briggs, E. F.
Courtney, L. T.
Courtney, C. L.
(G) Clark-Hall, R. H.
Davies, R. B.
Gerrard, E. L.
Gregory, R.
Grey, S. D. A.
Gordon, R.
L'Estrange Malone, C. J.
Longmore, A. M.
(E) Randall, C. R. J.
Risk, C. E.
Seddon, J. W.
Shepherd, P. A.
Waterlow, C. M.
Woodcock, H. L.

Flight Commanders :
Babington, J. T.
Boyle, Hon. J. D.
Crocker, W. R.
Fletcher, J. N.
Hetherington, T. G.
Hewlett, E. E. T.
(W/T) Ireland, W. P. de C.
Mackworth, J. D.
Oliver, D. A.
Pigot, R.
Rathbone, C. E.
(E) Travers, J. L.

Flight Lieutenants :
Ash, B. D.
Barnby, A. C.
Beevor, C. F.
Bigsworth, A. W.
Bone, R. J.
Bowhill, F. W.
(E) Briggs, W.
Brodribb, F. G.
Breese, C. D.
Bromet, G. R.
Busk, H. A.
(E) Cave-Brown-Cave, H. M.
(E) Cave-Brown-Cave, T. R.
Chambers, E. T. R.
Collett, C. H.
Cull, J. T.
Cunningham, A. D.
Dalgleish, J. W. O.
Dalrymple-Clark, J. H. W. S.
Draper, C.
Edmonds, C. H. K.
Fawcett, H.
Finch-Noyes, C. R.
(E) Fowler, I. G. Y.
Gaskell, A. B.
Grosvenor, Lord E.
Hicks, W. C.
Hooper, G. W. W.
(T) Hyde-Thomson, D. H.
Kershaw, R. H.
Kilner, C. R.
Littleton, H. A.
Lock, R. G.
Marix, R. L. G.
Maude, C. E.
Miley, A. J.
Nanson, E. R. C.
Newton-Clare, E. T.
Osmond, E.
Pierse, R. E. C.
Rainey, F. A.
(G) Robertson, E. D. M.
Robinson, C. E.
Ross, R. P.
Smyth-Pigott, J. R.
Sparling, E. H.
Sitwell, W. G.
Tomkinson, L.
Vernon, H. D.
Williamson, H. A.
Young, G. D.

Flight Sub-Lieutenants (Probationary) :
Bainsmith, B. F.
Barr, F. M. L.
Cripps, J. M. R.
Hay, L. B.
Wanklyn, H. G.
Wilson, C.
Wright, R.

Warrant Officers, First Grade :
(E) Ellison, H.
(E) Williams, F. H.

Warrant Officers, Second Grade :
Blundell, G. A. J.
Bobbett, H. C.
(C) Brownridge, J. G.
(E) Dearman, H.
Everett, F.
(E) Floyd, W. F.
Hancock, W. A
(C) Jones, T. D
(E) Killmayer, L.
(C) King
(E) Scarff, F. W.
(C) Staddon, L.

The following have privately secured pilot certificates in the years mentioned but are not graded for aeroplane work.

1911.

Bower, Lieut. J. A. (164)
Leveson-Gower, Com.
Williamson, Lieut. (150)

Naval. 1912.

Blatherwick, Lieut. G. (450)
Brown, Com. A. M. T. (345)
Edwards, Lieut. C. H. H.
D Freeman-Williams, Lt. F. A. P. (202)
Head, Lieut. G. G. W. (191)
Johnson, Capt. C. D.
Prickett, Lieut. C. B. (381)
Trewin, Asst. Paymaster (294)
Wheeler, Mid. N. F. (370)

Naval. 1913.

Brady, B. J. W. (394)
Brown, Lieut. A. C. G. (398)
Dobie, Lieut. W. F. R. (448)
Fitzmaurice, Lieut. R. (447)
Freeman, S. T. (393)
Picton-Warlow, Lieut. W. (451)
Ross, Lieut. R. P. (422)

Naval.

Up to end of March, **1914.**

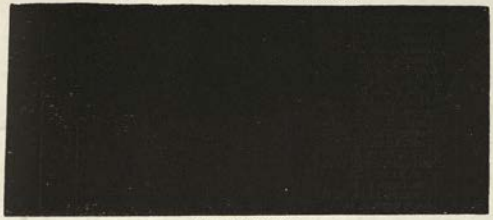
Andrews, P. O.
Badley, W. (E.R.A.)
Barnshaw, Lead. Seaman
Billing, Capt. C. G.
Case, A. E.
Clemens, Lead. Seaman S. T.
Cole, Shipwright W.
Coles, Asst. Paymaster V.H. (R. N. R.)
Cumming, Com. M.
Crocker, Lieut. W. R.
Don, Midshipman D. S.
Evill, Sub. Lt. D. C. S.
Fitzmaurice, Lieut. T.
Fraser, Lieut. H. M.
Grady, F. O. J. F.
Halahan, Lieut, R. C.
Harvey, Lieut. D.
Haskins, Asst. Paymaster F. K.
Healey, Walley, Lieut. R.
Hendry, J. C. P. O.
Hitch, Surg. F. G.
Hooper, P. Officer F. J.
Hunt, Lieut. R. E. B.
Keogh, M. S.
King, Sub. Lieut. R. A. (R. N. R.)
Leith, Com. G.
Macarthur, Lieut. C. G.
McCartan, Eng. Lieut.
Oxlade, Lieut. C. H. (664) (R. N. R.)
Priestley, Lieut. E. O.
Rees, V.
Saville, Able Seaman, G.
Saunders, Sub. Lieut. F. G. (R. N. V. R.)
Scott, Shipwright H. H.
Shaw, Eng. Art. W. F. (594)
Spencer-Warwick, Sub. Lieut. J. C. (R.N.V.R.) 745
Staddon, Lieut. R. (628)
Waddington, W. J. (573)
Walley, Act. Lieut. R. H. (R. N. R.)
Warwick, Sub. Lieut. J. C. S. (R. N. V. R.)
Watkins, Lieut. H. E. M. (724)
Williams-Freeman, Lieut. F. A. P.
Whitlock, Ch. Armourer, C. H. (684)

BRITISH MILITARY AVIATION.

Army Wing Royal Flying Corps, Aeroplane Section.

The Army wing has its headquarters at S. Farnborough, its constitution being as follows:—

1st squadron (airships or kites) see Dirigible Section.
2nd „ (aeroplanes) base at Montrose.
3rd „ „ „ „ Salisbury Plain.
4th „ „ „ „ S. Farnborough.



Flying Officers.

Abercromby, 2nd Lt. R. O. (134)
Allen, Lt. D. L. (318)
Anderson, Lt. E. V. (247)
Atkinson, Lt. K. P. (267)
Barrington-Kennett, Lt. B. H. (Adjutant) (43)
Beatty, Capt. W. D. (89)
*Birch, Lt. W. C. K. (375)
Board, Capt. A. G. S. (36)
Boyle, Lt. the Hon. D. G.
Burchardt-Ashton, Lt. A. E.
Burroughs, Lt. J. E. G.
Carmichael, Lt. G. L. (316)
*Chinnery, Lt. E. F. (211)
Cholmondeley, Lt. R. (271)
*Christie, Lt. A. (R.A.) (245)
Conran, Lt. E. L. (342)
*Corbalis, Lt. E. R. L.
Derbyshire, Capt. C. (257)
Dawes, Lt. L. (228)
Dawes, Capt. G. W. P. (17)
*Gill, Lt. N. J. (174)
Glanville, Lt. H. F. (307)
Gould, 2nd Lt. C. G. S. (282)
Harvey, Lt. E. G.
*Harvey-Kelley, Lt. H. D.
Herbert, Capt. P. L. W. (244)
Holt, Lt. A. V. (312)
Hublard, 2nd Lt. T. O. B. (202)
Hynes, Lt. G. R. (R.A.) (40)
James, Lt. B. T.
Joubert, de la F. Lt. P. B. (280)
Lawrence, Lt. W.
MacDonnell, Capt. H. C. (273)
MacClean, Lt. A. C. H.
*Mapplebeck, Lt. G. W. C. (386)
Martyn, Lt. R. B.
Mead, Sergt. J. (475)
Mellor, Capt. C. (155)
*Mills, Lt. R. P. (377)
Moss, Bt.-Major L. B. (241)
*Musgrave, Capt. H. (R.E.)
*Mulcahy-Morgan, Lt. T. W.
*Noel, Lt. M. W. (416)
Pepper, Lt. J. W. (98)
*Picton-Warlow, Lt. W. (451)
Playfair, 2nd Lt. P. H. L. (283)
*Pretyman, Lt. G. F. (341)
Porter, Lt. G. T. (R.A.) (169)
Pryce, Hon. Lt. W. J. D. (Qr.-mr.)
*Read, Lt. A. M. (336)
*Rodwell, Lt. R. M.
Roupell, 2nd Lt N. S. (237)
Shepherd, Capt. G. S. (215)
Soames, Lt. A. H. L.
Small, Lt. F. G. D. (429)
*Small, Lt. R. G. (343)
Smith-Barry, 2nd Lt. R. R. (161)
Stopford, Lt. G. B.
*Todd, Lt. E. (185)
Thompson, Lt. A. B.
Tucker, Capt. F. St. G.
*Vaughan, 2nd Lt. R. M.
Wadham, 2nd Lt. V. H. N. (243)
Waldron, Lt. F. F. (200)
Wanklyn, Lt. F. A. (284)

† Twelve of these *B.E.* were held up pending some special steel wire strainers which had been specified.
The above figures are mainly taken from *The Aeroplane*, 1st May, 1913.
*= under instruction; not yet graded.

Reserve.

Ashmore, Major E. B. (281)
Bell, 2nd Lt. C. G. (100)
De Havilland, 2nd Lt. G. (53)
Hartree, 2nd Lt. A (214)
Henderson, Col. D. (118)
Marks, Lt. C. H. (83)
Pizey, 2nd Lt. C. P. (61)
Salmond, Capt. W. G. H.
Smith, Lt. S. C. W.
Unwin, Lt. E. F.
Warter, 2nd Lt. H. de V. (107)

Special Reserve. (*2nd Lieuts. on probation.*)

Biard, H. C., de la F. (218)
Busteed, H. R. (194)
Charteris, R. L. (197)
Cutler, H. D. (189)
Davies, E. K. (22)
*Fuller, E. N. (325)
Fuller, H. C. (Ae. C. F.)
Gibson, W. E. (129)
Hammond, J. J. (32)
Humphreys, G. N. (300)
Lerwill, F. W. H.
Medford, L. S. (146)
Perry, E. W. C. (150)
Rickards, G. B. (400)
Sippe, S. V. (172)
Spratt, N. C. (339)
Ware, D. C.
Wilson, C. D. (Ae. C. F. 136)
*Wilson, C. W. (329)
Young, D. G. (207)

* * *

The following have qualified privately, R. Ae. C. brevets, but are not at present employed in the Aeroplane Section:—

1910.

Gibb, Lt. (10)
Snowden Smith, Lt. (29)
Watkins, Lt. H. E. (25)
Wood, Capt. H. F. (37)

1911.

Blacker, Lt. (12)
Cross, Lt. (154)
Dickson, Capt. (Ae. C. F. 260)
Harford, Lt. (152)
Harrison, Capt. (158)
Hoare, Capt. (126)
Hooper, Lt. (149)
Hutchinson, Capt. Steele (143)
Manisty, Lt. G. (135)
Pitcher, Capt. (125)
Sebag-Montefiore, Lt. (93)
Sneaton, Lt.-Col. (115)
Strover, Lt. E. J. (145)

1912.

Agnew, Capt. C. H. (240)
Alston, Capt. R. C. W. (255)
Ashton, Lt. A. E. B. (201)
Bannerman, Major Sir A. (213)
Boger, Capt. R. (335)
Borton, Lt. A. E. (170)
Boyle, Capt. M. (241)
Brodigan, Lt. F. J. (200)
Broke-Smith, Capt. D. W. (204)
Bulkeley, Lt. H. T. (246)
Carfrae, Lt. G. T. (188)
Chamier, Capt. J. A. (340)
Cordner, Capt. R. H. L. (277)
Ellington, Capt. E. L. (305)
Empson, Lt. J. (387)
Fielding, L. H. C. (212)
Fletcher, Lt. (229)
Hanlon, Lt. D. R. (311)
Jones, Lt. B. T. (230)
Lewis, Lt. D. (216)
Mackay, Lt. M. E. (177)
Mackworth, Lt. J. D. (209)
Martin-Barry, Lt. (Ae. C. F.)
Moore-Smith, Capt. D. W. (209)
Miller, Capt. G. R. (313)
Murray, Lt. R. G. H. (320)
Nicholas, Capt. C. P. (266)
Penn-Gaskell, Lt. L. de C. (308)
Percival, Lt. D. (226)
Pollok, Lt. R. V. (379)
Powell, Capt. D. W. (389)
Price, Capt. C. L. (299)
Rawson, Lt. K. (240)
Reilly, Lt. H. L. (252)
Ridd, Corporal F. (227)
Roger, Capt. R. (335)
Stott, Capt. J. N. J. (373)
Styles, Lt. F. E. (338)
Thomas, Staff-Sergt. (270)
Trevenen, Lt. R. J. (230)
Weeding, Capt. (182)
Winfield-Smith, Lt. S. C. (187)
Worthington-Wilmer, Lt. F. M. (254)

1913.

Archer, Lt. R. H. (434)
Bayly, Lt. C. G. G. (441)
Bruce, Sergt. W. R. (467)
Bourke, Lt. U. J. D. (479)
Cameron, Major N. J. (478)
Chidson, Lt. M. R. (471)
Crogan, Lt. F. J. L. (460)
Harrison, Lt.
Hawker, Lt. L. G. (435)
Horlern, Lt. L. C. (440)
Hosking, Lt. C. G. (472)
Hunter, Sergt.
Kemper, Sergt. K. (444)
Lee, Lt. C. F. (431)
Maclean, Lt. L. L. (427)
Marshall, Lt. R. (470)
McMullern, Lt. J. D. (436)
Merrick, Major G. C. (484)
Mitchell, Lt. W. G. S. (483)
Read, Lt. W. R. (463)
Rees, Lt. Col. W. D. (392)
Stafford, Sergt. W. G. (438)
Street, Sergt. E. J. (430)
Thomas, Sergt. Major
Vagg, Sergt. H. R. (443)

Military Aviators.—*Up to end of March*, 1914.

Barratt, Lieut. A. S.
Barton, Lieut. R. J. F.
Bateman, Lieut. B. M. B.
Bateman, Sergt. F. G.
Binney, Lieut. F. B.
Boger, Lieut. R. J. F.
Bridson, Lieut. C. E. R.
Bonham-Carter, Lieut. I. M.
Broadhurst, Lieut. G. H.
Buckland, Capt. G. C. B.
Burn, Lieut. W. W. A.
Cameron, Lieut. N. C. G.
Carpenter, Lieut. G. G.
Charlton, Capt. L. E. O.
Collins, Lieut. J. C.
Courtney, Lieut. H. S. N.
Couran, Capt. O. (Ae. C. F.)
Cox, Capt. G. H.
Crosbie, Lieut. D. S. K.
Darley, C. C.
Dowding, Capt. H. C. T.
Downer, Capt. C. P.
Dunn, Lieut. K. F. W.
Ellis, Capt. A. J.
Evans, Capt. L. P.
Fell, Capt. E. A. H.
Farrer, Sergt. F.
Ferguson, Capt. F. A.
Fisher, Capt. R. D.
Edridge-Green, Lieut. H. A.
Gallaher, Lieut. A.
Gardner, Sergt. J. B.
Grosvenor, Lord, A. E., Lieut
George, Lieut. A. K. D.
Harrison, Lieut. W. R. E.
Henderson, Capt. G.
Holoby, Sergt. C. A.
Hunt, Lieut. R. E. E.
Jackson, Capt. H. C.
Jackson, 2nd Lieut. J. L.
Jenkins, Lieut. N. M.
Jennings, Capt. H. C.
Kinsman, Major G.
Leighton, Lieut. J. B. T.
Levick, Major A.
Lewis, Lieut. E. B.
Liddell, 2nd Lieut. J. A.
Lindey, Lieut. S. E.
Macdonell, Capt. D. H.
Mansergh, Lieut. W. G.
Marsh, Lieut. A. C. E.
McCrae, Sergt. J.
McDonald, Lieut. C. J.
Mead, Lieut. J. F.
Mills, Lieut. G. D.
Monckton, Lieut. M. H.
Moore, Capt. A. G.
Mudie, Capt. T. C.
Murphy, Capt. C. F.
Pelham, Lieut. Hon. H. L.
Phillips, Major E. H.
Playfair, Lieut. L.
Pritchard, Lieut. F. H.
Robins, Corp. A. C.
Robinson, Lieut. C. E.
Roche, Lieut. H. J. A.
Ross-Hume, A.
Sherlock, Lieut. G. L. E.
Smith, Lieut. S. W.
Spence, Lieut. C. B.
Strong, Lieut. H. B.
Tennent, Lieut. J. E.
Van der Spuy, Lieut. K. R.
Wellesley, Lieut. Lord G.
Wood, Lieut. O. W. G.
Wood-Smith, Lieut. N.

BRITISH AVIATORS—PRIVATE.

PRIVATE AVIATORS.

(The number against any name is, unless otherwise stated, the R. Ae. C. pilot certificate number).

To end of **1911.**

Abbott, C. R. (101)
Aitken, A. H. (66)
Anderson, J. A. (164)
Archer, Ernest (Ae. C. F. 214)
Ballard, F. M. (151)
Barber, H. (30)
Barnes, G. A. (16)
Blackburn, H. (79)
Bowens, R. G. (39)
Boyle, Hon. Alan (13)
Bretherton, John (136)
Breton, J. (136)
Brown, H. R. (100)
Chataway, J. D. (167)
Challenger, G. H. (58)
Chambers, C. F. M. (168)
Cockburn, G. B. (5)
Cockerell, P. (132)
Cody, S. F. (9)
Conway-Jenkins, F. (74)
Crawshay, R. (133)
Colmore, G. C. (15)
Dacre, G. B. (162)
Darroch, G. R. S. (59)
Dolphin, W. H. (82)
Dunkinfield-Jones (138)
Ducroq, M. (23)
Dyott, G. M. (114)
Driver, E. F. (110)
Egerton, M. Hon. (11)
England, Gordon (68)
Esterre, C. R. (Ae. C. F. 259)
Ewen, W. H. (63)
Fleming, H. R. (69)
George, A. E. (19)
Graham-White, Claud (6) (Ae. C. F. 30)
Gresswell, C. H. (26)
Grey, W. H. de (107)
Hailse, E. (134)
Hamel, Gustav (64) (Ae. C. F. 358)
Harding, Howard (Ae. C. F. 213)
Harrison, Eric (131)
Hewlett, Mrs. (122)
Higginbotham, Gerald (96)
Hilliard, W. M. (102)
Hubert Charles (57)
Hotchkiss, E. (87)
Houdini, Harry
Hucks, B. G. (91)
Hunter, A. (157)
Johnston, St. Croix, P.G. (41)
Johnstone, W. Barnley (10)
Kemp, R. C. (89)
Keith-Davies, E.
King
Knight, Archibald (60)
Lawrence, W. (113)
Longstaffe, J. L. (140)
Lorraine, Robert (Ae. C. F. 126)
Low, A. R. (34)
Macdonald, L. F. (28)
Maron, Louis (62)
Martin, Mrs. (55)
Macfie, R. (49)
McArdle, W. E. (Ae. C. F.)
M'Clean, F. K. (21)
Mellersh, O. S. (155)
Melly, H. G. (Ae. C. F.)
Moorhouse, W.B.R. (147
Morrison, O. C. (46)
Moore-Brabazon, J. (1)
Noel, Louis (116)
Ogilvie, A. (7)
Pashley, Cecil L. (106)
Pashley, E. C. (139)
Paterson, C. E. (38)
Paul, E. A. (Ae. C. F.)
Percival, S. S. (111)
Petre, H. A. (128)
Philpott, R. W. (81)
Pixton, H. (50)
Prentice, W. R. (67)
Radley, J. (12)
Rawlinson, A. (3)
Raynham, F. P. (85)
Roe, A. V. (18)
Salmet, H. (99)
Sassoon, E. V. (52)
Santoni, L.
Singer, A. M. (8) (Ae. C. F. 24)
Slack, R. B. (157)
Smith, S. E. (33)
Smith, W. W. (Ae. C. F.)
Spencer, H. (124)
Somers-Somerset (Ae. C. F. 151)
Sopwith, T. (31)
Stanley-Adams, H. (97)
Stark (Ae. C. F. 110)
Stocks, Mrs. C. de B. (153)
Thomas, J. H. (51)
Travers, J. L. (86)
Turner, C. C. (70)
Turner, L. W. F. (66)
Valentine, J. (47)
Watt, W. O. (117)
Weir, J. D. (24)
Weston, John (Ae. C. F.)
Wickham, R. F. (20)
Woodward, G. A. T. (Ae. C. F.)

To end of **1912.**

Barnwell, R. H. (278)
Beech, A. C. (Ae. C. F.)
Bendall, W. (180)
Bettington, A. V. (326)
Birch, E. (322)
Brock, W. L. (283)
Cheeseman, W. E. (293)
Featherstone, W. (284)
Fowler, F. H. (221)
Gates, R. T. (225)
Garne, T. (178)
Geere, A. E. (310)
Gill, R. W. R. (258)
Hall, H. W. (352)
Hall, J. L. (291)
Hardman, W. L. (323)
Harrison, W. J. (275)
Hawker, H. G. (297)
Hedley, W. S. (274)
Hewitt, V. (302)
Higginbotham, V.C. (317)
Holyoake, R. G. (268)
James, J. H. (315)
James, H. H. (314)
Kershaw, R. H. (248)
Lister, R. A. (250)
Neshaw, H. P. (219)
Nevill, M. R. (223)
Manton, M. D. (231)
Meredith, C. W. (193)
Merriam, F. W. (179)
Parr, S. (184)
Payze, Arthur (337)
Petet, A. (224)
Prensiel, G. (198)
Simms, R. H. (261)
Stodart, Dr. D. E. (321)
Summerfield, S. (292)
Sutton, E. F. (295)
Sweetman-Powell, H. (251)
Taylor, V. P. (316)
Tremlett, L. A. (208)
Wood, V. G. (171)
Wynne, A. M. (314)
Wright, H. S. (331)
Yates, V. (306)

1913 (Brevets from 400 onward).

Andreas, F. G. (477)
Barron, J. C. (480)
Hodgson, W. P. (433)
Kehrmann, J. C. (420)
King, R. A. (482)
Lane, H. T. G. (418)
Lawford, E. H. (442)
Macandrew, H. E. W. (401)
Macneill, W. (Ae. C. F.)
McNamara, J. C. (445)
Minchin, F. R. (419)
Muller, P. M. (432)
Temple, G. L. (424)
Thompson, A. B. A. (452)
Tower, H. C. (466)
Rainey, T. H. (474)
Russell, A. L. (406)
Stewart, H. (473)
Strain, L. H. (476)

The following British aviators have been killed:

1910.
Rolls, Hon. C. (2)

1911.
Benson, R.
Cammell, Lieut. (45)
Grace, Cecil (4)
Napier (101)
Oxley, H. (78)
Ridge, T. (119)
Smith, V.*

1912.
Allen, D. L. (183)
Astley, J. R. D. (48)
Bettington, Lt. C. A. (256)
Campbell, Lindsay (220)
Clark, Miss J.
Fenwick, R. C. (35)
Fisher, E. V. B. (77)
Gilmour, Graham (Ae. C. F.)
Hardwick, A.
Hamilton, Capt. P. (194)
Hotchkiss, Lieut.
Loraine, Capt. (154)
Petre, Edward (259)
Parke, Lieut. W. (73)
Wilson, St., Serg. (252)
Wynese-Stuart, Lt. A.

1913.
Arthur, Lt. Desmond (233)
Berne, Payn'st'r (R.N.)
England, G. (301)
Macdonald, L. F.
Rogers-Harrison, Lieut. L. C. (205)

* Killed in Russia.

(The number against any name is, unless otherwise stated, R. Ae. C. pilot certificate number).

Up to end of March, **1914.**

Abercrumby, R. O.
Adams, F. P.
Addie, E. J. (634)
Alcock, J.
Ash, B. D. (Ae. C. F.)
Ashton, G. R.
Badgery, A. D. (717)
Badley, W.
Bamsan, E. B.
Bars, A. E. (749)
Barnshaw, F.
Barrington-Kennett, V. A.
Bateman, A. J.
Bateman, P. E.
Bayetto, T. H.
Bell, C. G.
Bevis, F. G. (629)
Billing, N. P. (632)
Birchenough, W.
Blackburn, V. G. (617)
Blake, M. B. (661)
Bland, J. A. (614)
Blundell, G. A. J.
Bobett, H. C.
Bouwens, B. G.
Bradford, H.
Brady, B. J. W.
Brereton, J.
Brown, L. E.
Buller, Mne. W.
Buss, H. A.
Busteed, H. R.
Butt, W. H.
Cannon, R. P.
Cantacuzene Prince, S.
Carr, R. H.
Case, A. E.
Carbery, Lord (Ae. C. F.)
Charteris, R. L.
Chataway, J. D. P.
Clappen, D. W. (591)
Clark, J. P. (738)
Creogh, R. P. (737)
Cripps, J. M. R. (698)
Cruikshank, G. (Ae. C. F.)
Cule, W.
Collis, R.
Cockburn, G. B.
Cooper, H. A.
Cooper, E. C.
Couran, O. M.
Courtney, H. S. N.
Cowley, G. E.
Culley, H. D.
Curtis, F. (780)
Davies, E. K.
Deakin, A.
De Havilland, G.
De Havilland, H.
Descoutter, A. M.
D'Estcrre, C. R.
Dismore, F. (580)
Draper, C. (646)
Driver, E. F.
Douglas, S.
Downer, C.
Duff, R. G. (709)
Dugan, J. R.
Duncan, T. S.
Dunn, F. G.
Dunez, M. E.
Eastwood, G. H.
Edmonds, J.
Edwards, R. W.
Elsdon, T. W.
Elliott, W. H. (706)
Ewing, A.
Eyre, V. W. (Ae. C. F.)
Ferte, J. C. J. de la (610)
Fill, S. J. V. (578)
Finney, J. L. (710)
Floyd, W. F.
Foggin, C. E
Ford, A.
Fowler, F. H.
Fowler, F. B.
Freeman, S. T.
Freke, J. (Ae. C. F.)
Fry, L.
Fuller, E. N.
Fuller, H. C.
Fulton, E. J.
Gallie, C.
Garnett, W. H. S. (618)
Gibson, W.
Gill, R. W. R.
Gipps, G. L.
Glew, M. F.
Goodden, F. W.
Grave, T.
Grey, R. (Ae. C. F.)
Hackney, H.
Hale, F. B. (786)
Halford, F. B. W. (639)
Hall, J. R.
Hammond, J. J.
Harper, R.
Harris, G. E.
Hart, W. E.
Hart-Davies, I. B.
Hearn, T. E.
Hewlett, Mrs. H. B.
Higginbotham, G.
Hoff, W.
Howard, B. H. E.
Howarth, N.
Howell, O. B.
Hudson, F.
Humphreys, G. N.
Hunter, A.
Jagenburg, L. H. (577)
Jenkins, F. C.
Jennings, M. R. W.
Jerrard, L. V.
Jezzi, P. G. L.
Johnson, H. R.
Jones, A. D.
Joubert de la, F. J. C.
Keating, H. S. (Ae. C. F.)
Keogh, M. S.
Kershaw, R. H.
Kidd, L. C. (655)
Lawford, E. H.
Lacey, C. V.
Lagrange, R. E. (792)
Lan-Davies, C. F. (753)
Landon, J. H. A.
Layzell-Apps, C. (626)
Lee, Z. Y.
Leigh, H. P. G.
Leighton, Sir B. B. M., Bart. (641)
Leith, F.
Leveson-Gower, E. L. M. (574)
Lerwill, F. W.
Leverrier, M. (576)
Lillywhite, R. J. (720)
Lister, R. A.
Lockwood, M. H. (Ae. C. F.)
Lousted, G. J.
Macdonnell, J. C. (708)
Madeley, J. W. (Ae. C. F.)
Mahl, V. (784)
Martindale, H. B. (722)
Maskell, P. H.
McArdle, W. E.
McCartan, P. H.
McGrath, J.
Morriss, E. H.
Murray, R. M. M. (782)
Murray, D. G. (750)
Nelson, H.
Newton-Clare, E. T.
Norris, E. F.
O'Connor, T.
Parker, L.
Paterson, R. O.
Penny, R. E. C. (584)
Perry, E. W. C.
Pickles, S.
Piercy, B. H. (785)
Pierson, R. K. (600)
Pizey, C. P.
Powell, R. C. (596)
Pratt, F.
Price, J. B. (760)
Prickett, G.
Prosser, E.
Racine-Jacques, H.
Reed, P. H.
Rees, V.
Reilly, F. M. (581)
Robert, W. S.
Roberts, C. le D. W. (624)
Roupell, N. S.
Russell, H.
Russell, R. B.
Torr, J. H. G.
Tower, H. C.
Valentine, J.
Voss, C. H.
Savill, G. J. W. H.
Scotland, J. W. H. (658)
Scott, H. H.
Shaw, D. E.
Shaw, W. F.
Singh, W. W.
Sippe, S. V.
Skene, R. G.
Slack, W. W. J. (616)
Smith, W. (579)
Smiles, G. M. (783)
Snow, C. B.
Spratt, N. C.
Staddon, L. R.
Steinbach, R. H.
Stirling, R. M.
Strange, L. A. (575)
Strugnell, W. V.
Susans, F.
Wadham, V. H. N.
Ware, D. C.
Warren, T., 1st Class A.M. (748)
Watts, W. (633)
Webb, C. F. (719)
Webb, H. (598)
Webster, H. J. (Ae. C. F.)
Weber, C. (Ae. C. Hungary)
Whitehouse, E. R.
Whitelock, C. H.
Wilson, D. C.
Wilson, J. P.
Wood, B. G.
Woodcock, H. L. (Ae. C. F.)
Wong, G. T. K.
Yates, H. A. F. (Ae. C. F.)

Killed.

1913.

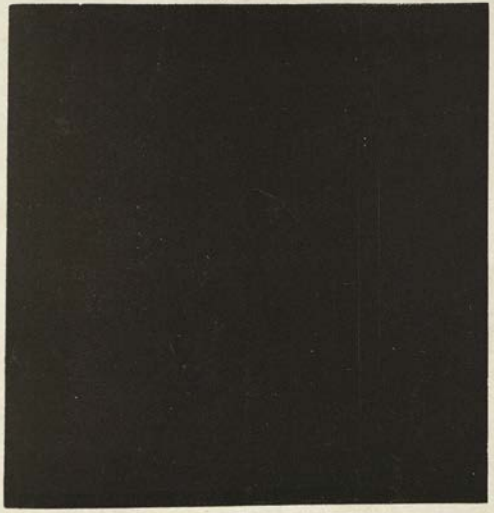
Arthur, Lt. D. L.
Berne, Paymaster.
Cody, Col. S. F.
Dickson, Capt. B.
England, G. W.
Hardwick
Hewetson, Major A. W.
Kennedy, Lt.
Macdonald, L. F.
Merrick, Major G. C.
Lushington-Wildman, Lt.
Parke, Lt. R. N.
Rogers-Harrison, Lt. L. C.
Slack, R.
Wight, R. N.

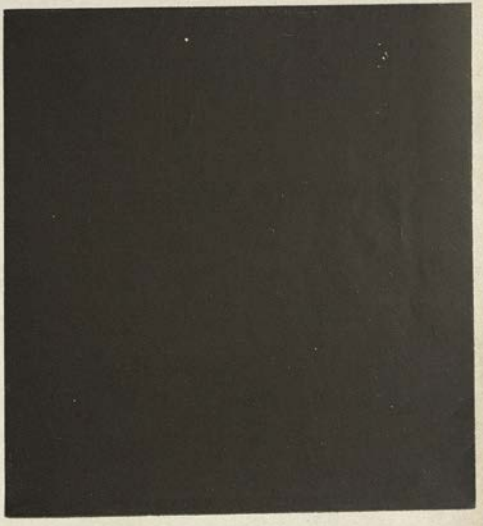
1914.

Allen, Lt. C. R. W.
Anderson, Capt.
Barlow (mechanic)
Burroughs, Lt. J. E. G.
Carter (air mechanic)
Cresswell, Lt.
Deane, Sergt.
Downer, Capt. C. P.
Empson, Lt.
Gipps, G. L.
Hamel, G.
Hordern, Lt. R. L. C.
Haynes, E. T.
Kemp, R.
Marty, P.
Rice, Commander A.
Skene, Lt.
Treeby, Lt. H. F.
Temple, L. G.

A

AIRCRAFT FACTORY. Royal Aircraft Factory, Farnborough, near Aldershot. For a long time this establishment had been engaged in dirigible construction and repairs. In 1911 it was





AIRCRAFT MANUFACTURING Co., Ltd. 47, Victoria Street, London, S.W. Works: Hendon, London, N.W. This company established in 1912, holds **all** the British rights for the *H. & M. Farman* types. It constructs in England all *Farman* types at its own works.
(See *Farman*, FRENCH).

A—*continued.*

AVRO. Aeroplanes. A. V. Roe & Co., Clifton Street, Miles Platting, Manchester; also Shoreham, Sussex. A. V. Roe designed his first machine, a biplane, in 1906. It was the first British machine to leave the ground. He then experimented with triplanes in Lea Marshes, where he managed to fly with only 9 h.p. in 1908-9. In August, 1910, built *Roe III*, and in September, *Roe IV*, also triplanes (see 1911 edition for full details). In 1911 he abandoned triplanes for the Avro biplane. School: Shoreham.

Capacity: about [redacted] machines a year. Capital, £50,000.

Type (1911). *Photo, Alan H. Burgoyne, Esq., M.V.*

Model.		Land Machine 500. 1911 modified		Land Machine 504.		Land Machine 508.		Land Machine 511.		Seaplane 504.		Seaplane 509.		Seaplane 510.	
Length	feet (m.)	29	*8·84*	29½	*8·84*	26¾	*7·93*	22·3	*6·70*	29½	*8·84*	44½	*13·40*	37½	*11·28*
Span	feet (m.)	36	*10·98*	36	*10·98*	44	*13·42*	26	*7·93*	36	*10·98*	80 56	*24·39* *17·07*	63 38	*19·21* *11·59*
Area	sq. feet (m²)	335	*31*	242	*32*	470	*44*	235	*22*	342	*32*	931	*86*	564	*53*
Weight (empty ...	Lbs. (kgs.)	1200	*590*	1574	*714*	1680	*762*	950	*431*	1719	*780*	4510	*2050*	3125	*1431*
Weight (fully loaded,	Lbs. (kgs.)	900	*408*	924	*419*	1000	*456*	675	*306*	1070	*485*	2800	*1270*	2005	*909*
Motor	h.p.	50 Gnome		80 Gnome		80-100 Gnome		80 Gnome		80 Gnome		2-120 Aust Daimler		160 Gnome	
Speed ... (max.	m.p.h. (km.)	65	*105*	82	*130*	70	*110*	100	*160*	75	*120*	70	*110*	80	*130*
Speed ... (min.	m.p.h. (km.)	30	*50*	35	*55*	35	*55*	35	*55*	40	*65*	35	*55*	35	*55*

Note.—No. 500 is the 1911 machine very slightly modified. This type was so successful that it was decided to standardise.

Type 504.—A two-seater tractor biplane, capable of high speed; easily dismounted; suitable for all weather, cross country, and reconnaissance work. This machine is also constructed as a Seaplane.

Type 508.—A two-seater propeller biplane, with monoplane tail. Suitable for gun-carrying and reconnaissance work. Weight includes gun.

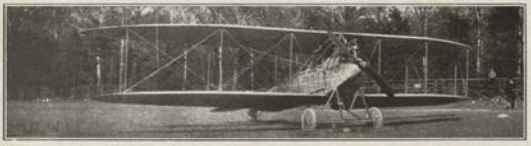
Type 509.—A fuselage Sea-biplane with twin propellers and engines, these being mounted on the planes at either side of the fuselage. A fighting machine, carrying a gun and wireless installation, capable of seating from two to four persons. Weight includes gun.

Type 510.—A two-seater tractor sea-biplane. This is a heavy, high-speed machine, carrying a wireless installation, and having folding planes. Suitable for reconnaissance and all service work.

Type 511.—A light single-seater Tractor Biplane. This machine is easily dismantled for the purpose of transport and is especially suitable for scouting.

B

BEARDMORE. Wm. Beardmore & Co., Dalmuir, nr. Glasgow, Scotland. Construct under license the *D.F.W.* type (for details see GERMANY) fitted with Beardmore Austro-Daimler motor.



Military biplane.

B

BLACKBURN Aeroplanes. Blackburn Aeroplane and Motor Co., Olympia, Leeds. Blackburn produced his first machine early in 1910 (see 1911 edition for details). In the latter part of that year he designed the machine which ultimately developed into the *Blackburn* military. In 1911 other types were produced, all being fitted with the patent Blackburn triple control. School at Filey. Barks has been the principal *Blackburn* flyer. The type has also been very successfully flown by naval officers. Capacity of works:

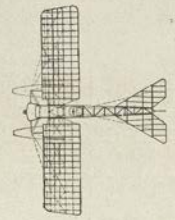
Model and date.	1914. Hydro-mono. 2-seater type.	1914. Navy hydro-biplane.
Length ... ... feet (m.)	28½ *8·53*	...
Span ... ... feet (m.)	38 *11·58*	62 *18·89* (upper) 47½ *14·47* (lower)
Area ... ... sq. feet (m²)	...	...
Load ... Total ... lbs. (kgs.)	1000 *726*	1450 *658*
Load ... Gross ... lbs. (kgs.)	950 *431*	3000 *1361*
Motor ... ... h.p.	80 Gnome	200 Gnome
Speed ... max. m.p.h. (km.)	60 *100*	...
Endurance .. ... hours	4	...

The 80 H.P. *Blackburn* Monoplane has done a great deal of work during the last year. In October last, one of these machines won the Inter-County 100 miles "Wars of the Roses" Air Race, for a Silver Challenge Cup presented by "The Yorkshire Evening News."

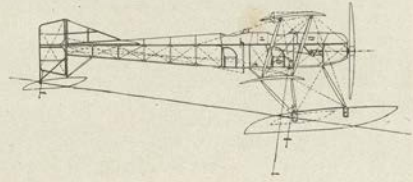
This machine has flown repeatedly in 50 miles' gales, also in rain and snow. It has flown over 4,500 miles, made over 300 recorded flights, and given demonstrations at 25 distinct flying exhibitions.

It has carried nearly 250 passengers and on one occasion made an afternoon cross-country flight with a lady nearly 70 years of age from Harrogate to Bridlington and back, a distance of 120 miles.

The machine is still flying and as serviceable as ever.



Hydro-monoplane.



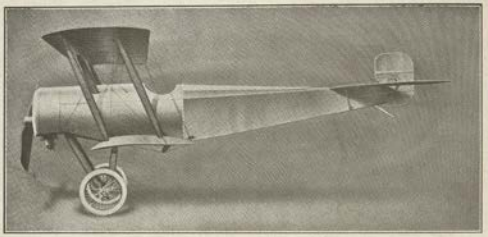
Hydro-biplane.

B—*continued.*

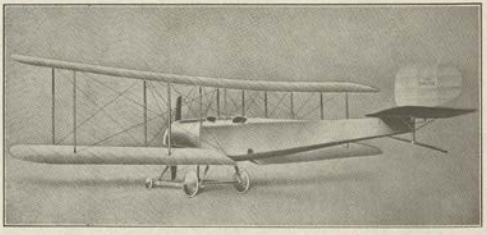
BRISTOL. The British & Colonial Aeroplane Co., Ltd., Filton House, Bristol. Founded 1910. Have very extensive works (area, sq. feet) on the outskirts of Bristol, where they manufacture to their own designs practically every type of flying machine. Flying grounds: Salisbury Plain, Brooklands.

	Two-seater **Tractor biplane.**		**Hydroplane.**		Single-seater **Tractor Biplane.**	
Length ... ... feet (m.)	29½	*8·900*	31	*9·55*	20¾	*6·3*
Span ... ... feet (m.)	37¼	*11·5*	36	*11*	21¼	*6·7*
Area ... ... sq. feet (m²)	420	*39*	409	*38*	161	*15·0*
Weight ... total ...lbs. (kgs.)	694	*315*	640	*295*	341	*155*
useful ...lbs. (kgs.)	352	*160*	352	*160*	180	*82*
Motor ... ... h.p.	80 Gnome		...		80 Gnome	
Speed ... max. m.p.h. (km.)	75	*120*	62	*100*	95	*153*
min. m.p.h. (km.)	34	*56*	37	*64*	47	*76*
Endurance ... ... hrs.	5		4		3	

There are also *Bristols* constructed under license in France (*Breguet*), and Italy (*Caproni*).



Single-seater.



Two-seater.

B—*continued.*

BLERIOT Aeronautics. Belfast Chambers, 150, Regent Street, London, W. School: Hendon. British office of the *Blériot* firm (see FRANCE).

BRITISH BREGUET CO., 1, Albemarle Street, Piccadilly, London, W. Works and offices: 5, Hythe Road, Cumberland Park, Willesden, London, N.W. Established 1912. Constructs in England *Breguet* models, some of which are beginning to vary in detail from the originals (see FRANCE).

BRITISH CAUDRON. (See *Bwen.*)

BRITISH DEPERDUSSINS. British Deperdussin Aeroplane Co., Ltd., 39, Victoria Street, Westminster, London, S.W. School: Hendon.
Chairman: Admiral The Hon. Sir E. R. Freemantle, G.C.B., C.M.G.
Managing Directors: Lieut. J. C. Porte, R.N., D. Laurence Santoni.
Secretary: N. D. Thompson.
This firm handles the French models of *Deperdussins*, but has in addition a special hydro-aeroplane of its own, of which one was built in 1912. Details of this special machine are:—**Length,** 27 feet 10 inches (8·50 m.) **Span,** 42 feet (12·80 m.) **Area,** 290 sq. feet (27 m²). **Weight,** total, 1,800 lbs. (816 kg.); useful, 1,250 lbs. (566 kg.) **Motor,** 100 h.p. Anzani. **Speed,** 67 m.p.h. (110 k.m.) Other models sold by the firm are of French type exactly (see FRANCE).

BRITISH DONNET-LEVEQUE. Handled by Aeros, Ltd., 39, St. James' Street, Piccadilly, London, S.W. Company forming March, 1913 (see FRANCE). Works and school at Shoreham.

BRITISH FARMANS. (See *Aircraft Co.*)

BRITISH HANRIOTS. Hewlett & Blondeau, Omnia Works, Vardens Road, Clapham Junction, London, S.W. Construct all types of *Hanriot* machines (see FRANCE), also build to private specifications, and deal in accessories generally.

BRITISH NIEUPORTS. Company forming 1913. Representative: M. Bonnier, 2, Goulders Green Crescent, London, N.W.

C

COVENTRY ORDNANCE. The Coventry Ordnance Works, Ltd., Coventry. London office: 28, Broadway, Westminster, S.W. Established 1912. Capacity: ■■ machines a year without difficulty.

		1912. Model 10.	
Length	feet (m.)	29	8·80
Span	feet (m.)	56	17
Area	sq. feet (m²)	630	58
Weight ... total	lbs. (kgs.)	1900	861
Weight ... useful	lbs. (kgs.)	800	362
Motor	h.p.	100 Gnome	
Speed ... max.	m.p.h. (km.)	60	97
Speed ... min.	m.p.h. (km.)	...	
Endurance	hrs.	...	

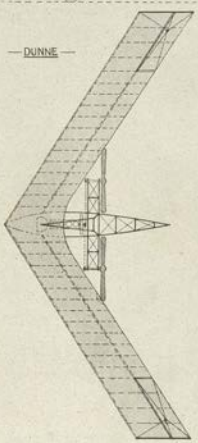
Remarks.—Experimental machines. No change in the model since.

D

DUNNE. The Blair Atholl Aeroplane Syndicate, Ltd., 1, Queen Victoria Street, London, E.C. School: Eastchurch. In 1906 Lieut. Dunne was employed by the British Army authorities for secret aeroplane experiments. He had at that time patented a monoplane of ◄ type. In 1907 *Dunne I.* was tried on the Duke of Atholl's estate in Scotland, but failed to fly, being smashed on the starting apparatus. *Dunne III.*, a glider, 1908, was experimented with successfully by Lieut. Gibbs. In the same year *Dunne IV.* a larger power driven edition made hops of 50 yards or so. Early in 1910 the War Office abandoned the experiments. *Dunne II.*, a triplane of 1906 design, was, by consent of the War Office, assigned to Prof. Huntingdon, who made one or two short flights with it at Eastchurch in 1910. At the same time the above syndicate was formed, and *Dunne V.* built by Short Bros., was completed in June, 1910. In 1912-13 the Huntingdon, modified, was flying well.

Model and date.		50 Gnome. **1912-13** single-seat mono. **D 7.**		**1912-13** 2-seater mono. **D 7** *bis.*		**1912-13** biplane. **D 8.**		**1912-13** biplane. **D 9.**	
Length	... ... feet (m.	*not given*							
Span	... ... feet (m.	35	*10·66*	35	*10·66*	46	*14*	45	*13·70*
Area	... sq. feet (m².	200	*18·5*	200	*18·5*	552	*51*	448	*42*
Weight	total ...lbs. (kgs.	1050	*476*	1200	*544*	1700	*771*	1693	*768*
	useful ...lbs. (kgs.	359	*161*	528	*239*	414	*187*	509	*231*
Motor	... ... h.p.	50 Gnome		70 Gnome		90 Green		80 Gnome	
Speed	... ... m.p.h. (km.	60	*95*	60	*95*	45	*70*	50	*80*
Number built during 1912	...	1		1		1		5 *6 flying* (*'13*)	

Notes.—Biplane *D 8* is identical with the original pattern *Dunne V.* except that it has only one propeller instead of two. It has been flown completely uncontrolled in a 20 m.p.h. wind, carrying a R. Ae. C. observer as passenger.



Original *Dunne* biplane *D 8*.

E

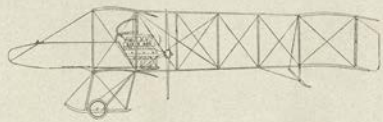
E.A.C. The Eastbourne Aviation Co., Ltd., Eastbourne.

Model and date.	E.A.C. Biplane. 1914.	
Length ... ... feet (m.)	31½	9·59
Span ... ... feet (m.)	54	16·45
Area ... ... sq. feet (m².)	700	65
Weight ... unloaded lbs. (kgs.)	1800	816
Weight ... load ...lbs. (kgs.)	870	395
Motor ... ... h.p.	120 Green	
Speed ... max. m.p.h. (km.)	60	95
Endurance ... ... hrs.	...	

G

GRAHAME-WHITE. The Grahame-White Aviation Co., Ltd., 166 Piccadilly, London, W. Works and Flying Ground: Hendon. Founded by C. Grahame-White, the well-known aviator, who in 1909 commenced operations with a school at Pau. Later this was removed to England, and a general agency for the sale of aeroplanes, etc., established. This developed, and early in 1911 the firm was handling a special British agency for the U.S. *Burgess* type known as "The Baby." The Hendon Aerodrome was acquired, and a factory established, which has grown continually ever since. In April, 1912, a monoplane to special design was completed. By the close of the same year biplanes of advanced design were constructed. Capacity of the works is equal to [redacted] machines a year if necessary.

Model and date.	1914. 2-seater Tractor biplane. Type XIV.	1914. 2-seater Military biplane. Type XI.	1914. 5-seater Biplane. Type X.
Length ... feet (m.)	21¼ *6·40*	26½ *7·92*	38½ *11·58*
Span ... ... feet (m.)	25 *7·61*	37 *11·27*	62½ *18·89*
Area ... sq. feet (m.²)	240 *22*	400 *37*	925 *86*
Weight (total lbs. (kgs.)	1100 *500*	1800 *816*	3200 *1450*
(useful lbs. (kgs.)	450 *200*	720 *325*	1100 *499*
Motor ... ... (h.p.)	60 Le Rhone	100 Gnôme Monosoupape	100 Green
Speed (max. m.p.h. (k.p.h.)	65 *105*	80 *130*	51 *80*
(min. m.p.h. (k.p.h.)	40 *65*	42 *67*	30 *50*
Endurance ... ...hrs.	4 hrs.	4½ hrs.	6 hrs.



G.W. BIPLANE—TYPE III.

Notes.—These three types are also fitted with 80 h.p. Le Rhone, and 50 h.p. Gnome, and 120 h.p. Austro-Daimler engines. Floats can be fitted to Type XI.

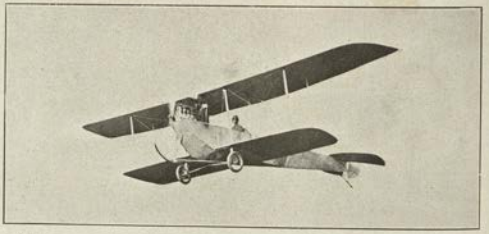
H

HOWARD-FLANDERS. L. Howard-Flanders, Ltd., c/o R. M. Dodds, 17, Old Broad St., London E.C. *School:* Brooklands. Established February, 1912, by L. Howard-Flanders, whose connection with aviation dates from the pioneer days.

		B 2 2-seater biplane.		S 2 single-seat monoplane.		F 5 2-seater monoplane.		B 3 2-seater biplane.	
Length	... ... feet (m.)	31½	9·59	28	8·50	31	9·45	31	9·45
Span	... ... feet (m.)	40	12	35	10·70	39	11·90	40	12
Area	... sq. feet (m²)	300	30	190	17½	250	23	300	36
Weight	total ... lbs. (kgs.)	1500	680	1180	535	1600	726	1650	748
	useful lbs. (kgs.)	450	204	350	159	600	272	600	272
Motor	... ... h.p.			80 Gnome		80 Gnome		80 Gnome	
Speed	max. m.p.h. (km.)	65	105	82	132	70	115	68	110
	min. m.p.h. (km.)	35	55	45	73	42	68	40	65

Remarks.—*B 2* climbing speed 600 feet (61) per minute, full load.
Four monoplanes were bought by the British Army in 1912.

Monoplane.



Biplane.

H—*continued.*

HANDLEY-PAGE Monoplanes.

Handley Page, 72, Victoria Street, S.W. Works: 110, Cricklewood Lane, N.W. Flying ground: Hendon. Established at the end of 1908. In June, 1909, it was turned into a Limited Liability Co. Since then it has been busily employed in producing its own machines, also others to inventor's specifications. About the end of 1911 the firm bought up and sold all the machines of the Aeronautical Syndicate—*Valkyrie* and *Viking* types. It is doubtful whether any of these V type still exist—in any case it does not matter. Four were presented to the R. Flying Corps. Of these one was smashed up, the others, one army and two navy, were used to teach mechanics to take down and re-assemble engines, etc. Handley-Page also bought up the *Radley-Moorhouse* machines (Bleriot copies), and disposed of them.

The 1912-13 *Handley-Page* type is as follows—a development along regular lines of the original H.P. machine:—

Handley-Page V.

Length, 27½ feet (8·40 m.) **span,** 42½ feet (12·95 m.) **area,** 240 sq. feet (22¼ m².)

Weight.—Total, 1700 lbs. (500 kgs.) Empty, 800 lbs. (365 kgs.)

Motor.—50 h.p. Gnome. **Speed.**—55 m.p.h. (90 km.)

Remarks.—The fixed tail area is 32 sq. feet. Body is entirely enclosed, stream line form. The passenger sits behind the pilot. Mounted on wheels and one long skid forward.

Principal pilots have been the late E. Petre (who made in it the only flight through London), the late Lieut. Parke, R.N., S. Pickles, and L. R. Whitehouse. The machine has been flown with two passengers, in addition to the pilot.

The 1914 particulars of this firm were not received at the time of going to press.

HAMBLE RIVER, LUKE & CO., Hamble, Hants.

Model and date.		H. L. 1 1914.			
Length	feet (m.)	30	*9·14*		
Span	upper plane feet (m.)	60	*18·28*		
	lower plane feet (m.)	53	*16·15*		
Area	sq. feet (m²)	774	*72*		
Weight ...	total ... lbs. (kgs.)	2670	*1200*		
	useful... lbs. (kgs.)	2500	*1120*		
Motor	h.p.	150 N.A.G.			
Speed ...	max. m.p.h. (km.)	65	*105*		
	min. m.p.h. (km.)	32	*50*		

H—*continued.*

HANDLEY-PAGE Monoplanes. Handley Page, 72, Victoria Street, S.W. Works: 110, Cricklewood Lane, N.W. Flying ground: Hendon. Established at the end of 1908. In June, 1909, it was turned into a Limited Liability Co. Since then it has been busily employed in producing its own machines, also others to inventor's specifications. About the end of 1911 the firm bought up and sold all the machines of the Aeronautical Syndicate—*Valkyrie* and *Viking* types. It is doubtful whether any of these V type still exist—in any case it does not matter. Four were presented to the R. Flying Corps. Of these one was smashed up, the others, one army and two navy, were used to teach mechanics to take down and re-assemble engines, etc. Handley-Page also bought up the *Bodley-Moorhouse* machines (Blériot copies), and disposed of them.

The 1912-13 *Handley-Page* type is as follows—a development along regular lines of the original H.P. machine:—

Handley-Page V.

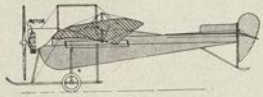
Length, 27½ feet \| 8·40 m. **span,** 42½ feet \| 12·95 m. **area,** 240 sq. feet \| 22¼ m². **Weight.**—Total, 1500 lbs. (680 kgs.) Empty, 800 lbs. (363 kgs.)

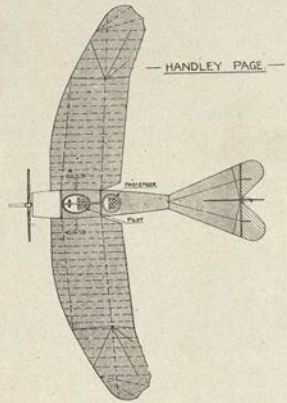
Motor.—50 h.p. Gnome. **Speed.**—55 m.p.h. (90 km.)

Remarks.—The fixed tail area is 32 sq. feet. Body is entirely enclosed, stream line form. The passenger sits behind the pilot. Mounted on wheels and one long skid forward. Full description and details, *Flight*, 26th October, 1912.

Principal pilots have been the late E. Petre (who made in it the only flight through London), the late Lieut. Parke, R.N., S. Pickles, and L. R. Whitehouse. The machine has been flown with two passengers, in addition to the pilot.

Military work.—During 1912 five biplanes of the *B.E.* type were ordered by the British War Office. Several monoplanes were ordered by foreign governments.





L

LAKE FLYING Co. Windermere. Established 1911, by E. W. Wakefield, with a view to hydro-aeroplane experiments. The first machine was a *Curtiss* type built by A. V. Roe, which flew in November, 1911. In 1912, a special biplane generally of *Farman* type but with more camber to the planes, was built.

Lake as re-modelled.

Length.—30½ feet (11 m.) **Span.**—42 feet (12·80 m.) **Area.**—270 sq. feet (25 m.²) **Motor.**—Gnome. **Speed.**—45-55 m.p.h. (72-54 k.p.h.)

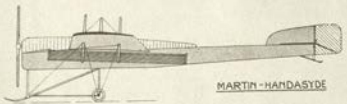
The single float is 6 feet wide, flexibly connected. Balancers mounted on a spring board. Water rudders for steering at slow speed.

M

MARTINSYDE. Messrs. Martin & Handasyde, Brooklands, Weybridge, Surrey. Output capacity: about [redacted] per annum.

Model and date.		1912. Mono. 2-seater.		1913. Mono. 2-seater.	
Length	... ... feet. (m.)	35½	*10·75*	35	*10·65*
Span	... ... feet (m.	42½	*12·95*	42½	*13*
Area	... ... sq. feet (m².	290	*27*	285	*26½*
Weight	total ... lbs. (kgs.)	...		1212	*550*
	useful ... lbs. (kgs.	...		551	*250*
Motor	... ... h.p.	65 Antoinette		80 Laviator	
Speed	max. m.p.h. (km.	63	*102*	78	*125*
	min. m.p.h. (km.	...		...	

Notes.—Wood construction. *Landing:* wheels and one skid. *Controls:* warping wings and rear elevator. Triangular body. The two models are very nearly identical.



The 1914 particulars of this firm were not received at the time of going to press.

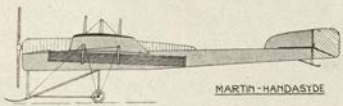
Latest model.

M

MARTINSYDE. Messrs. Martin & Handasyde, Brooklands, Weybridge, Surrey. Output capacity: about ■ per annum.

Model and date.		1912. Mono. 2-seater.	1913. Mono. 2-seater.
Length ... ... feet. (m.)		35½ *10·75*	35 *10·65*
Span ... ... feet (m.)		42½ *12·95*	42½ *13*
Area ... ... sq. feet (m²)		290 *27*	285 *26½*
Weight ...	total ... lbs. (kgs.)	...	1212 *550*
	useful ... lbs. (kgs.)	...	551 *250*
Motor ... ... h.p.		65 Antoinette	80 Lavistor
Speed ...	max. m.p.h. (km.)	63 *102*	78 *125*
	min. m.p.h. (km.)	...	...

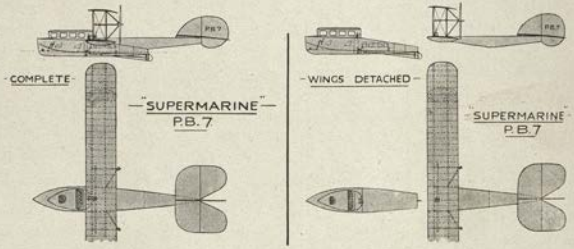
Notes.—Wood construction. *Landing:* wheels and one skid. *Controls:* warping wings and rear elevator. Triangular body. The two models are very nearly identical.



P

PEMBERTON-BILLING, Southampton, England.

Model and date.			P.B. 7 Supermarine.			
Length	...	... feet (m.)	34	10·36		
Span	...	... feet (m.)	57½ 43½	17·37 13·10		
Area	...	... sq. feet (m².)	558	52½		
Weight	...	machine, lbs. (kgs.)	3000	1450		
		useful ...lbs. (kgs.)	950	431		
Motor	...	... ... h.p	225 Sunbeam			
Speed	...	max. m.p.h. (km.)	70	110		
		min. m.p.h. (km.)	45	70		



S—*continued.*

SHORT BROS. Works and flying grounds: Eastchurch, Isle of Sheppey, Kent. London office: Queen's Circus, Battersea Park. Took up construction at a very early date. *Wright* agents in 1909. Have built numerous biplanes and monoplanes to specifications. Produced their own first machine (see 1911 edition) in 1910.

	S 41. 1913. Hydro Biplane.			S 45. 1913. Military Tractor Biplane.			S 38. 1913. Military Nacelle Biplane.		S 34. Standard School.		1911-12.	1911-12.
	80 h.p. 2-seater.	100 h.p. 2-seater.	160 h.p. 4-seater.	70 h.p. 2-seater.	80 h.p. 2-seater.	160 h.p. 4-seater.	50 h.p. 2-seater.	80 h.p. 3-seater.	50 h.p. 2-seater.	70 h.p. 2-seater.	1-seater, mono.	Tandem tractor biplane.
Length ... ... feet (m.)	35 *10·67*	39 *11·90*	45 *13·70*	35½ *10·80*	35½ *10·80*	40 *13·70*	35½ *10·80*	35½ *10·80*	42 *12·85*	42 *12·85*	25 *7·60*	35½ *10·80*
Span ... ... feet (m.)	40 *13·70*	50 *15·25*	50 *15·25*	42 *12·90*	45 *13·70*	50 *15·25*	32 *15·85*	52 *15·85*	46½ *14·20*	46½ *14·20*	29½ *9*	42 *12·90*
Area ... ... sq. feet (m²,)	390 *36*	...	...	...	...	...	...	...	...	...	186 *17*	...
Weight (Machine ... lbs. (kg.)	1200 *545*	1700 *764*	2000 *909*	1080 *490*	1100 *500*	1890 *860*	950 *432*	1050 *480*	1100 *500*	1150 *523*	...	850 *385*
Weight (Useful ... lbs. (kg.)	771 *350*	...	...	...	...	...	...	...	...	...	...	...
Motor ... ... h.p.	80 Gnome	100 Gnome	160 Gnome	70 Gnome	80 Gnome	160 Gnome	50 Gnome	80 Gnome	50 Gnome	70 Gnome	50 Gnome.	70 Gnome.
Speed ... (max. (m.p.h.)	65 *105*	60 *97*	74 *120*	60 *97*	70 *113*	74 *120*	42 *68*	58 *94*	39 *63*	48 *78*	...	58 *94*
Speed ... (min. (m.p.h.)	50 *80*	50 *80*	56 *90*	50 *80*	50 *80*	56 *90*	35 *57*	39 *63*	34 *55*	38 *61*	..	...
Endurance ... ... hrs.	4	5	6	5	5	6	4	5	4	5	5	5
Number built during 1912 ...	...	...	...	...	...	...	...	...	...	...	...	...
	Remarks.—Floats are two long pontoons. Subsidiary floats at tips of lower plane. Small tail float with water rudder. W.-t. compartments to floats. Tandem seated, pilot in front. The observer's seat can accommodate two if necessary.			Tandem seats, pilot in front. Fittings for maps, etc.			Specially designed for reconnaissance. Tandem seats, pilot in front. An extra passenger can be accommodated.		Solely designed for school work. Seats side by side.		No longer built, but still in existence.	

Old 1911-12 Tractor biplane.

Old 1911-12 mono.

S—*continued.*

SOPWITH. The Sopwith Aviation Co., Ltd. Works: Canbury Park Road, Kingston-on-Thames. *School*: at Brooklands. Established by T. O. M. Sopwith, the well known aviator at Brooklands, Autumn of 1913, where during 1912, a 70 h.p. tractor biplane and a 40 h.p. biplane was turned out.

The Company is now a private limited company. Officers are:—Directors: T. O. M. Sopwith, M. G. Sopwith, R. O. Cary. General manager: R. O. Cary. Secretary: H. P. Musgrave. Works manager: F. Sigrist. New Works, about 40,000 sq. feet have been erected and are run in conjunction with old works. Distance between the two buildings is 50 yards. Output capacity: machines per annum.

Existing types are:—

Sopwith Scout Tractor.
Sopwith Military Tractor (2-seater).
Sopwith School Seaplanes.
Sopwith Tractor Seaplanes.
Sopwith Bat Boat.

All proved machines and in use by H.M. Forces and by foreign Governments. As measurements vary so constantly the company prefer to withold all figures at present.

The most striking performance was winning the Schneider Cup at Monaco with *Sopwith* Scout Seaplane, 100 h.p. Gnome, and the official War Office test of *Sopwith* Scout land machine, 80 h.p. Gnome, which gave a speed variation of 40 to 95 m.p.h., fully loaded with pilot and 3½ hours fuel.

Flying boat.

Scout Biplane. 80 h.p.

Seaplane.

V

VICKERS. Vickers, Ltd., Vickers House, Broadway, Westminster. *School:* Brooklands.
Output capacity ▬

Model and date.			1914. Fighting type biplane.	
Length	... ...	feet (m.)	27¼	*8·23*
Span	... ...	feet (m.)	37	*11·28*
Area	... ...	sq. feet (m²)	385	*36*
Weight	total,	lbs. (kgs.)	1760	*799*
	useful,	lbs. (kgs.)	900	*408*
Motor	... ...	h.p.	100 Monosoupape	
Speed	max.	m.p.h. (km.)	70	*110*
	min.	m.p.h. (km.)	45	*70*
Endurance	... ...	hrs.	4½ hours	

Remarks, Notes and Details.—Climbing capacity of 450 feet per minute fully loaded. Radius of action 240 miles, and carries (including pilot, passenger and gun,) 200 rounds of ammunition. Fuselage of high tensile steel.

This machine has been designed entirely for offensive action in the air against other aeroplanes. For this purpose the gun is mounted in the front of the machine where it has a clear field of fire. The firer has also a perfectly clear view, and is sheltered from all wind by the design of the cowl.

W

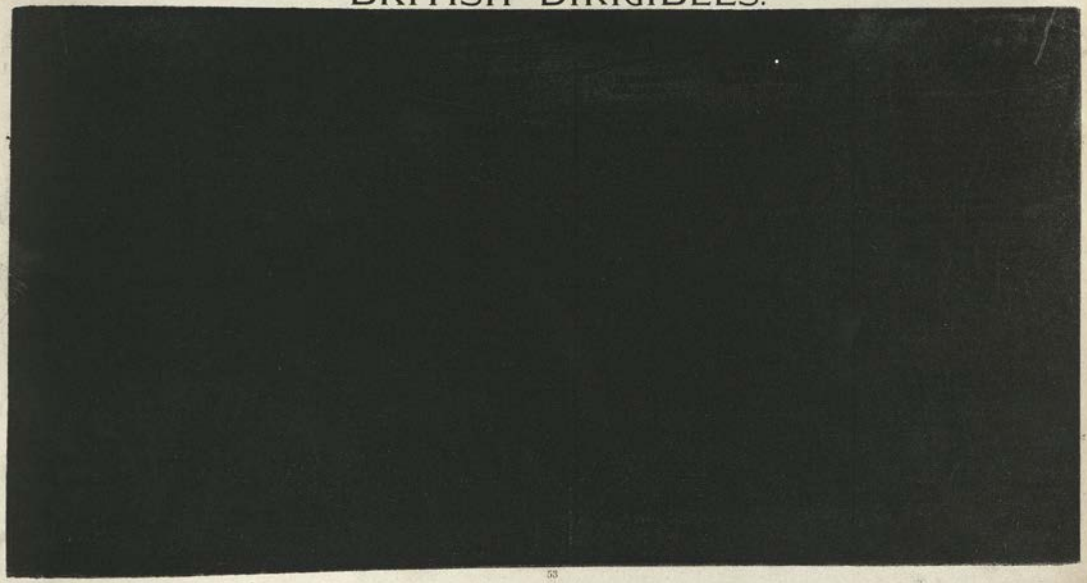
WHITE. J. Samuel White & Co., Ltd., shipbuilders and engineers, East Cowes, Isle of Wight. London office: 28, Victoria Street, S.W. This well-known firm of torpedo craft builders, etc., formally opened an aviation department on 1st January, 1913, with Howard T. Wright as general manager and designer.

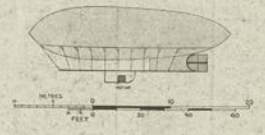
		1913. Navy ‘plane.		1914. Wight seaplane.	
Length	... feet (m.)	30	9·15	33	10·05
Span	... feet (m.)	44	13·40	63	19·20
Area	... sq. feet (m²)	500	46½	730	67½
Weight	total lbs. (kgs.)	3000	907	3400	1542
	useful lbs. (kgs.)	650	295	2000	1170
Motor	... ... h.p.	160 Gnome		200 Salmson	
Speed	max. m.p.h. (km.)	70	113	75	47
	min. m.p.h. (km.)	35	57	35	22

Remarks.—Hydro-biplane, with Howard T. Wright patent aeroplanes to give wide range of speed. Two patent hydro floats, 21 feet (6·40 m.) long, three steps on each.

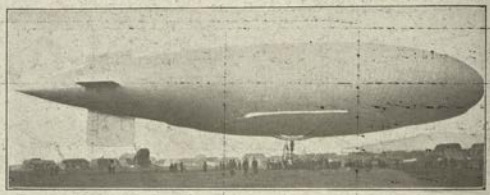
1914 Wight seaplane.

BRITISH DIRIGIBLES.





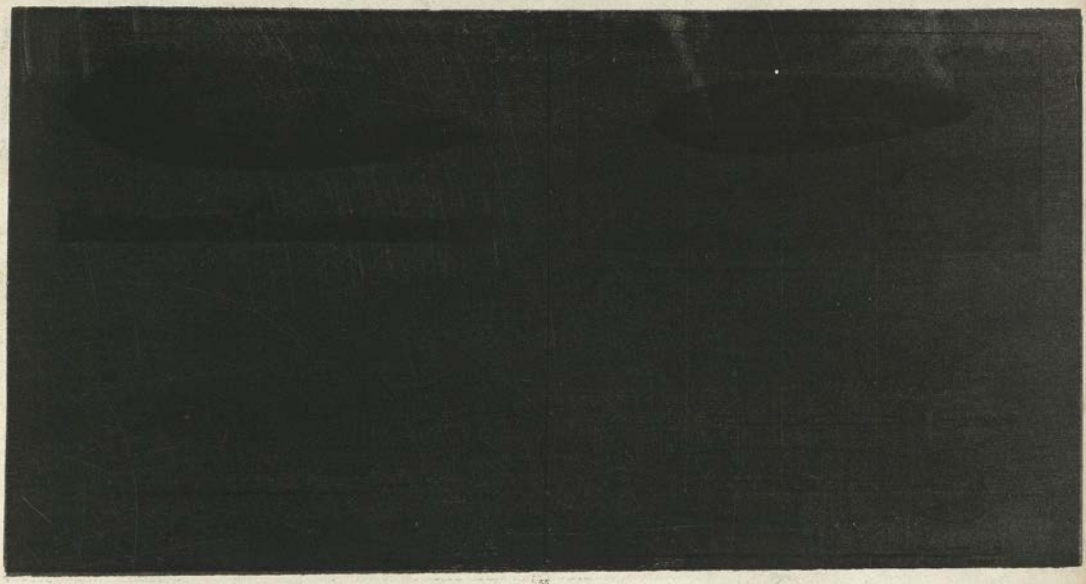
WILLOWS. The naval one is fitted with a boat-shaped car.



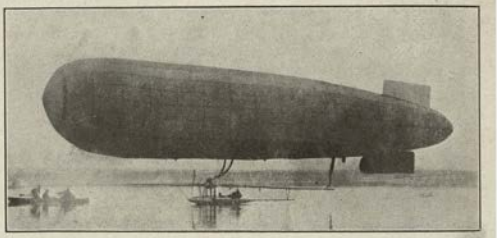
PARSEVAL (photo of a sister-ship).

New Construction.

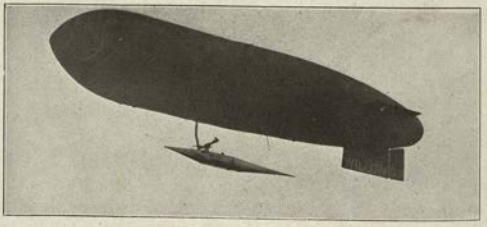
Messrs. Vickers have acquired the Parseval rights for the British Empire, and several airships of this type are likely to be put in hand by them shortly. Also reported that a big rigid is projected.



Willows Dirigibles ...	II.	IV. Naval.	V.
Date	1910-11.	1912.	1913-14.
Volume ... ... (c. feet	32,500 *920*	24,000 *2229*	50,000 *4645*
(m.	...	...	...
Length ... ... feet (m.	120 *36·59*	100 *30·47*	130 *39·62*
Diameter ... feet (m.	23 *7·01*	20 *6·09*	26 *7·92*
Envelope ... ... fabric	rubber cotton	varnished silk	rubber fabrics
ballonets	2	2	2
Nacelle	...	...	...
Lift ... (total, tons (kg.)	about ½	...	...
useful, tons (kg.)	...	...	...
Motors ... ... h.p.	30	35 Anzani	60-80
Propellers ... number ...	2 swivel	2 swivel	2 swivel
blades ...	2	4	2
dium. feet (m)	6½ *1·85*	6 *1·82*	8 *2·43*
Max. speed ... m.p.h. (km.	25 *40*	34 *55*	38 *60*
Full speed endurance ... hrs.	...	...	...
Complement	3	2	4
Station	Cardiff & London	Farnborough	Hendon



WILLOWS IV. (Naval)



WILLOWS V.

BRITISH COLONIAL AIRCRAFT.

AUSTRALIAN.

Military Aviation.

In January, 1913, the Australian Flying Corps was instituted, as a part of the citizen forces. During 1913, about £5,000 is to be spent.

The force is to consist ultimately of 4 officers, 7 warrant officers and sergeants, 52 mechanics.

The school is at Duntroon. Course includes—mechanics of the aeroplane, aerial motors, meteorology, aerial navigation by compass, aerial photography, signalling, etc. Mr. Harrison is in command with Lieut. H. Petre as assistant.

The machines are mostly *B.E.*

Australian Aviators.

Baily
Banks, R. C.
Bosteed, H.
Duigan, J. R.
Hammond, J. J.
Harrison
†Hart
†Lindsay, C.
Petre, H.
Pickles
Watts

† = killed.

NEW ZEALAND.

Nothing doing worth mention. One *Bleriot*, 80 h.p., presented 1913 by the *Standard*, London.

Aerial Societies.

Aeronautical Society of Canada, c/o. M. P. Logan, 99 Gloucester Street, Toronto
McGill Aviation Club, McGill University, Montreal
Oshawa, Ontario Ae. C.

AVIATORS.—*Private.*

Bell, Dr. Graham
McCurdy, J. A. D.
(U.S.A. Ae. C. 18)
McHardy
Symonds, E. F.
St. Henry R.

Military Aviation.

In June, 1914, two officers of the Ottawa defence force were sent to Salisbury Plain for instruction, in connection with the proposed establishment of a flying corps.

BRITAIN OVERSEAS AEROPLANES.—INDIAN

Military Aviation.—A certain number of officers belonging to the Indian Army have qualified as pilots when home on leave, but there is no organised force. One is, however, proposed.

Private Aviation.—In the past two or three home-made machines appeared, and one or two were imported, but most or all are now extinct.

BRITAIN OVERSEAS AEROPLANES.—SOUTH AFRICA.

Military Aviation.—Non-existent.

Private Aviation.—J. Weston is a qualified pilot, but at the outside there are not more than two effective machines in the country.

BULGARIAN.

In the Balkan War, 1912-13, Bulgaria hastily organised an aviation corps. This, though necessarily lacking in military organisation, proved very useful on several occasions.

Military Aviators.—The principal are Capt. Saketaroff, Lieuts. Milkoff, Taraxchieff and Petroff. A number of other officers in various stages of training.

Military Aeroplanes.—About **12** (*Bleriots* and *Bristols* mostly).

CENTRAL AMERICAN, ETC.

General Note.—Nicaragua and S. Domingo have both purchased one or two aeroplanes for their military forces: but nothing appears to have been done with them.

Guatamela has one aeroplane flown by Nannini, who has been appointed military flying instructor.

Cuba has one, flown by Pavla.

CHILIAN.

Military Aeroplanes.

The available force consists of **18** machines:—

8 *Blériots*, **4** *Breguets*, **1** *Voisin*, **4** *Sanchez-Besa*, **1** *Deperdussin*.

Aerodrome:—

Lo Espejo. (Four sheds and some portable hangars).

AVIATORS.

Military Flying Corps.

Concha, General, Inspector-Gen. of Aeronautics
Donoso, Dr. R. U., Surg.
Leon, 1st Lt. A. G., Adjut.
Larrain, C., Quarter-master.
Prado, Copt. M. V., Commant.

Military Pilots.

Ampuero, Sergt. A.
Bello, Lt.
Cabezas, M.
Cazarino, Lt.
Conberas, Lt.
Conzalez, Sergt. F.
Menadier
Page, Sergt. L. O.
Perez, 1st Lt. E.
Rojas, Sergt. F.
Torres, 2nd Lt. J.
Verscheure, Sergt.
Valenzuela, 1st Lt. G.
Urgua, 1st Lt. A.

Private.

Cabezas, M.
Donoso, P. L.
Figuroa

Killed.

1914.
Mery, Lieut.

CHINESE.

AVIATORS.

Gunn, T. (*Instructor*).
Lym, A. (*Instructor*).
Lee, Y. L.
Tsai Tao Prince
Tsing, Col.
Poa, Lt.
Wee Gee
Yoa, Lt.

About 40 officers under instruction in June, 1914.

Military Aviation.

In March, 1913, orders were placed for six 80 h.p. *Caudrons*, also for six 50 h.p., and a decision arrived at gradually to acquire a large force. A home-made aeroplane was built at Nanuan, in 1913.

In January, 1914, Art Lym was appointed flying instructor to the Chinese Army.

In the "White Wolf" operations, 1914, four of the *Caudrons* were employed, and found very effective in locating the enemy. No casualties to the machines occurred.

Aerodrome.

The military school (*Caudron*) is at Peking.

DANISH.

Aerial Societies:—

Danske Aeronautiske Selskab, 34 Amaliegade, Copenhagen.

Aerial Journals:—

None; but *Motor* (3 Bredgade, Mezz, Copenhagen) deals with aerial matters.

Flying Grounds:—

Klampenburg, Copenhagen.
Skandinarisk Aërodrom.
Vernon.

Aeroplane Factories, etc.:—

Farmans: Copenhagen Branch.
Berg & Storm.

Danish Machine.

BERG & STORM. (1913) Monoplane.

Army Aeroplanes.

3 (1 *H. Farman* (50 h.p.), 1 *M. Farman* (80 h.p.), 1 *Berg & Storm*).

Navy Aeroplanes.

4 (1 *H. Farman* (50 h.p.), 1 *M. Farman* (70 h.p.), 2 *Donnet-Leveque* (80 h.p.)

* = Superior Certificate.

AVIATORS.

Military.

*Grut, Lt.
Hameller, Lt.
Nielsen, P.
Jacobsen, Capt.
*Ussing, Lt.

Naval.

Axel, Prince
Christiansen
Laube, Lt.
Hoeck, Lt.
Thiele, Capt.
Ullidt, Kapt.

Killed.

1913.
Birch, U.

Private.

Amundsen, Capt.
Brandt.
Folmes, Hansen
Jensen, L.
Maltke, Count
Nervoe, A.
Severinsen, S.
Svend, A.
Svendsen, R.
Seth-Jensen
Thorup, K.
Walh, W.

DUTCH.

(Revised by I. SCHIERE, Aeronautical Engineer and Librarian of the Dutch Ae. C.)

Aerial Societies:—

Haagsche Proefvliegtuig Club (Se V.d. Boschstreet 20, The Hague).
Nederlandsche Vereeniging voor Luchtvaart (Nassau Zuilensteinstraat, 10, The Hague). (Ae. C.)
Rotterdamsche Model Aero Club (Roebussenstreet 229b, Rotterdam).

Colonial:

Nederlandsche Indische Vereeniging voor Luchtvaart.

Aerial Journals:—

De Luchtvaart (Ged Oude Gracht, 144, Haarlem). Fortnightly.
Avio, Wynbrugstraat 13, Rotterdam. Fortnightly.

Flying Grounds:—

Breda-Gilske-Rijen.—6 hangers.
Soesterberg.—20 hangars.

Army Aeroplanes.

Up to the end of 1911 there were none, though some officers had their own private ones (*H. Farman's* mostly).

At end of **1912.**

2 monos. *Deperdussin* (for Java).
1 biplane. *De Bronckère* (for Java).

AVIATORS.

(The number against any name is, unless otherwise stated the Ae. C. Nederlandsche pilot certificate number.)

To end of **1911.**

Military.

Bakker, H. Yandrig
Labouchere, Lieut. J.
Meel, Lieut. Van
Poorton, Lieut. H. ter
Versreegh, Lt. W. C. J.

Private.

Bable, F. K.
Boerlage, M.
Burgh, Van der
Fokker, A. H. G.
Hilgers, J. W. E. L.
Konings, L.
Koolhoven (1)
Kuller, G. P. (2)
Laige, F. (4) (323, F.)
Mulder, A.
Riemsdyk, Van F. (5)
Ryk, Madame Bde.
Wynmalen, H (6) (208, F.)

The following Dutch aviator has been killed:

1911.
Van Maasdyck, C. (130, Ae. C. F.)

DUTCH AEROPLANES.

DE BROUCKERE. Biplane. *H. Farman* type. Details, *De Luchtvaart*, No. 8, 1911.

FOKKER. Monoplane. Anthony Fokker, of Haarlem. In early 1912 flew at Breda.

MONNIER-HARPER. Monoplane. (O.P.I.I.) Generally *Blériot* type. Built 1911.

VAN DEN BURG. Monoplane. Early in 1912 was flying at Johannisthal, Germany.

VREEDENBURGH. Monoplane. (O.P.I.I.) Blend of *Blériot* and *Antoinette*. Motor, 75 h.p. Miesse. Completed December, 1909.

FOKKER. Monoplane. (See GERMANY for details.) Firm now established in Germany.

DUTCH DIRIGIBLES.

Military.

DUINDIGT. Non-rigid.
(Zodiac make.)

The above dirigible has been scrapped.

FRENCH.

(Special French Editor.)

Aerial Societies:—

Aero Club de France.
Academie Aeronautique de France.
Aeronautique Club de France.
Société des Aëronautes du Siège.
Aero Club du Sud Ouest.
Aero Club du Rhone.
Aero Club du Nord.
La Ligue Aerienne du Sud.
Société Francaise de Navigation Aérienne.
Société d'encouragement à l'Aviation.
(Full list of clubs next page.)

Aerial Journals:—

L'Aerophile.
L'Aero.
L'Aeronaute.
Aerostat (Bulletin Aeronautique).
Aerostat (Academie d'Aerostation)
Revue de l'Aerostation.
Le Ballon.
L'Aerostation.
L'Aeronautique.
Bulletin Aeronautique.
Encyclopedicle l'Aviation.
La Ligue Nationale Aerienne.
Revue de l'Aviation.
L'Aeromécanique.

Principal Flying Grounds:

Antibes.—Hauriot school.
Beauce.
Betheny.—Sommer school. Deperdussin School.
Buc.—M. Farman school.
Buoy.
Chalons.—Sommer school.
Chalais-Meudon (Military)
Châtres.—Savary school.
Cran, Marseilles.
Crotoy.—Caudron school.
Croix d'Hins, Bordeaux (Aer. Lig. du Sud.) Area 6 km. Track. Free sheds.
Corbeaulieu pres. Compregne.—Doutre school.
Etampes.—Bleriot school. Farman school.
Grand Camp, Lyons.
Issy les Moulineaux.—Astra school
Juan-le-Pias.—Paulhan aquaplane school.
Juvisy, near Paris.—Aerodrome. Caudron school. Goupy school.
La Brayelle, Douai.—Breguet school.
Da motte Brueil dans L'Oise.
Le Bourget, Paris.—100 sheds.
Le Mans.
Moisson.
Mourmelon.—Voisin school.
Napante.
Nice.—Small and rough surface.
Pau.—Bleriot school.
Reims.—Aerodrome.
St. Cyr.
Villacoublay, Paris.—Breguet, Nieuport and Astra schools.

FRENCH AEROPLANES.

Military Aviation.

In February, 1912, the then total of 208 effective aeroplanes were divided into "squadrillas," consisting of eight aeroplanes; attached to these eleven or twelve motor cars, one traction car and one fast car, also a repairing car and repairing van.

It was then estimated that at the end of 1912, **344** aeroplanes would be available for service.

The estimated *personnel* was provisionally fixed at 234 officer pilots, 210 scouts, 42 mechanics, 110 officers, 1,600 corporals or sappers and 550 privates.

Approximately £880,000 was spent in aviation during 1912, and £1,000,000 was estimated for future years.

The French military aviation centres are all upon somewhat the same footing as fortresses, and the greater part of the work comes under the head of "confidential." The principal school is at St. Cyr, which was specially selected because the ground is rough and mostly covered with small shrubs: it being held important to train officers from the first to rise and land on ground similar to that most likely to be found in war time. Each station is supplied with large portable wooden-framed hangars covered with canvas. These can be rapidly taken to pieces and re-erected. Each station is supplied with its own special motor transport.

All military machines are provided with a compass and map case in front of the pilot and sketching apparatus in front of the observer.

Although a few non-commissioned officers have been taught flying, the organization only contemplates the employment of commissioned officers as pilots. The age limit is 38.

On April 16th, 1913, the flying corps was modified. The principal features of the corps as now existing are as follows:—

Establishments.

1. Schools.
2. Special establishments, dealing with purchase, construction, and big repairs.
3. *Directions.* Administration of *material.*
4. Depots. A species of dockyards dealing with minor repairs, etc.

Administration.

There are three main groups, each commanded by a colonel. Each group consists of dirigibles and aeroplane "escadrilles," and is fully equipped with establishments, etc. The three centres are:—

1. Versailles.
2. Reims.
3. Lyon.

General.

All squadron units are made up of machines of the same make and power. Pilots are detailed as required to any particular unit, and liable to transfer from one to another, though in practice such transfers are rare.

Army Aeroplanes.

During 1912 nearly 500 machines were delivered to the Army, but a great many old machines have been scrapped. At the end of March, 1913, the force stood at 421 effective for war machines, plus an uncertain number of school machines and obsoletes.

About one-third or more of the effective aeroplanes were *Farmans.* The rest consisted of all leading French types, proportionated more or less to the productive capacity of these firms. Also certain other makes experimental.

Navy Aviation.

The Navy section of French military aviation is still in the "being formed" process. No data are yet available as to the ultimate force to be provided. At present the number of effective war machines is small. It is made up of hydro-avions of the following types:—*Astra, Borel, Breguet, Caudron, Deperdussin, Donnet-Lerouge, Farman, Paulhan-Curtiss, Sanchez-Besa,* the total at end of March, 1913, being well under 20. There are also two special *Bleriot* type fitted with floats, which carry 330 lbs. of explosive, are fitted with wireless, have a speed of 140 km. p.h. (85 m.p.h.), and a radius of about 600 miles (1,000 km.)

PRINCIPAL FRENCH ARMY AND NAVY AVIATORS.

(In each case the number against each name is, unless otherwise stated, the Ae. C. French certificate pilot number.)

Army.

Abadie, Sous Officier
Acevedo, Lieut. (740)
Acquaviva, Lieut. Paul V. (68)
Aiguillon, Lt. R. d' (308)
Aubry, Lieut.
Balensi, Capt. Albert (173)
Bares, Capt. (543)
Basset, Lieut. Paul (145)
Battini, Lieut. G. (508)
Baugnies, Lt. J.B.E. (193)
Beatrix, Sous Officier
Bellemois, Lieut. G. (546)
Bellenger, Capt. M. (45)
Berni, Lieut. (760)
Biard, Capt. G. M. (261)
Bihan, Lieut.
Binda, Lieut. Louis (232)
Blard, Lieut. (460)
Bobillier, Lieut.
Boerner, Lieut.
Boissonas, Lieut. (443)
Bon, Lieut.
Boncour, Lieut. (478)
Bonnier, Lieut. (478)
Bonnier, General (137)
Boucher, Lieut.
Bonsnuet, Lieut. P. (295)
Breley, Lieut.
Bremot, Capt.
Bronchard, Lieut.
Brugiere, Lt.
Brule, Lieut. (436)
Buncher, Lieut.
Burgeat, Capt. M. (44)
Camerman, Lieut. F. (53)
Camine, Capt.
Campagne, Lieut. (782)
Casse, Capt. (415)
Chabert, Lieut.
Charoux, Sous Officier
Chavenac, Lieut. E. (551)
Chentin, Lt. E. J. (233)
Chevreau, Lieut. R. (132)
Clavenad, Lieut. P. (294)
Clere, Lieut. (465)
Clolus, Commdt. G. (97)
Couret, Lieut.
Coville, Capt.
D'Abrantes, Lieut.
D'Aquillon, Lieut.
De Bernis, Lieut.
De Caumont, Capt.
De Chanac Lauzac, Capt.
De Geyer, Lieut.
De Gorge, Lieut. (805)
De Goys, Capt.
De Lafargue (417)
De L'Estrade, Lieut.
De Rose, Lieut. P. (477)
Destace, Capt.
Destouches, Capt.
Devarenne, Lieut.
Devaux, Lieut. R. (158)
De Ville d'Avray, Lieut.
Didier, Sous Officier (765)
Do-Jrd, Lieut.
Dorand, Sous Officier (753)
Duparquet, Capt.
Duperron, Capt. (196)
Dupin, Lieut.
Etave, Capt. A. (89)
Ersterae, Capt.
Felix, Capt. J. (270)
Fequant, Lieut. A. (65)
Fequant, Lieut. P. (340)
Fierstein, Sous Officier
Francezon, E. (410)
Foirelline, Lieut.
Garnier, Lieut. (305)
Garnier, Lt. (826)
Gastringer, Lieut.
Gaubert, Lieut. E. (313)
Germain, Lieut.
Girard, Lieut. J. (197)
Giromde, Lt. A. de
Godefroy, Sous Officier (583)
Gouin, Lt. M. E. R. (348)
Gourlez, Lieut. (521)
Grezaud, S.-Lt. P. (265)
Grailly, Lieut. (399)
Gronier, Lieut. J. (138)
Grandjean, Sapper
Guibart, Lieut.
Guiton, Sous Officier
Hable, Sous-Lt. A. L. (257
Hugoni, Capt. E. (165)
Hanouille, Lieut.
Henequin, Lieut.
Henri, Lieut. (497)
Herli, S.-Lt. (255)
Hurard, Sous Officier
Issartier (531)
Jacquet, Lieut.
Joly, Lieut. F. (341)
Jost, Lieut. R. G. (264)
Kass, Capt.
Langardi, Lieut.
Laurent, Sous Officier (246
Le Beau, Capt.
Le Bleu, Lieut.
Lelievre, Lieut. E. (522)
Lemanson, Lieut (506)
Le Mauget, Capt.
Letheux, Lieut. G. (142)
Letort, Sapper (170)
Letourneur, Lieut.
Lucca, Lieut. D. (154)
Ludmann, Lieut. G. (255)
Lussigny, Lieut.
Machin, Lieut.
Maillert, Lieut. F. (146)
Maillois, Lieut. J. (131)
Malherbe, Lt. de (534)
Maneyrol, Lieut.
Mancha, Lt.
Mare, Lt.
Marconnet, Capt. (90)
Marie, Capt. Felix (80)
Marlin, Lieut.
Marmies, Lieut.
Marty, Sous Officier (816)
Massol, Lieut.
Mauger, Lieut.
Maurice, Lieut.
Mazac, Lieut. (592)
Miguud, Lieut. G. (501)
Morel, Sous-Lt. P. (262)
Morlaye, Lieut. la
Mouchard, Lieut.
Negre, Capt.
Nimaud, Lieut.
Nogues, Capt. (114)
Normand, Lieut. F. (314)
Pelloux, Sous-Lt. M. (346)
Peraldi, Lieut.
Peretti, Sous Officier
Pierre, Lieut.
Ponchet, Lieut.
Prat, Lieut.
Precardin, Lieut.
Princetau, Lieut.
Postulat, Sergt.
Quennelen, Sous Officier
Ragot, Lieut.
Remy, Lieut. H. C. (143)
Reynard, Lieut. (668)
Rinbert, Lieut.
Rocca-Serra, Lieut.
Rochette, Lieut. J. (564)
Rolland, Lieut. M. E. (545)
Ronin, Lieut.
Rougerie, Lieut.
Sauleillon, Lt. A. (674)
Saunier, Lieut. G. (153)
Seguin, Sapper (528)
Serelle, Lieut. (747)
Silvestre, Lieut. (599)
Sido, Capt. Marie (65)
Sourdeau, Lieut. A. (474)
Soulielani, Lieut.
Thomas, Lieut. (846)
Thomas, R. (116)
Touzet, E. (485)
Tretzne, Lieut.
Tricornot de Rose, Lt. de (350)
Vandamone, Lieut. (535)
Van de Vazro, Lt. (491)
Vandine, Lieut.
Varcin, Lieut.
Vaudein, Lieut.
Verdier, Sous Officier (538)
Vibra, Lieut.
Vigne, Lt. Henri (315)
Vinda, Lieut.
Vitra-Rougerie, Lieut.
Vocayeau, Lieut.
Vogoya, Capt.
Vuilliereme, Lt. L. (174)
Watteau, Lieut.
Willemenz, Lieut. (759)
Yence, Lieut. R. (220)

Naval.

Byasson, Lt. de V. (175)
Cayla, Lieut. (458)
Conneau, Lieut. (322)
" Beaumont "
Davelny, Com dr.
Delage, Lieut. G. (219)
Fournier, Lieut.
Hastefille, Lieut. (247)
Lafon, Lt. (194)
Leve, Lieut. (243)
Parasa, Lieut. (179)
Reymond, Lieut. (306)

Owing to the War copy for this page has not been delivered.

FRENCH AEROPLANES—PRIVATE.

Private Aeroplanes.

The total number of machines built in France during 1912 has been estimated at about 1,500. This includes military as well as private machines, also machines exported, and appears to be unduly generous even so. The actual total of machines commenced and completed in 1912 is nearer 1,000.

The number of private aeroplanes—excluding demonstration and school machines is small.

PRIVATE AVIATORS (brevets to end of 1911).

(In each case the number against each name is, unless otherwise stated, the Ae. C. French certificate pilot number.)

Algrin, Rene (252)
Allard, M. (480)
Alimcourt (488)
Andre, C. (102)
Aubrun (21)
Bachot A. (271)
Baeder, F. de (107)
Bague, E. (337)
Balliod, Louis (230)
Balaye, A. (275)
Balsan, Jacques (22)
Baratoux, Marcel (49)
Barbotte, Ernest (268)
Barra, Franck (171)
Barrier A. (64)
Banier, Rene (64)
Bathiat, Georges (257)
Bathiat, Leon (110)
Beard, Pierre (276)
Beaud, Edouard (150)
Becue, Jean F. (265)
Bellier, Albert (297)
Belloi, Andre (317)
Benoist, Jean (369)
Bergognie, Charles (373)
Bernard, A. (505)
Berliot, Henri J. (450)
Biard, Desire J. (460)
Bielovucic, Jean (87)
Bill, Henri (205)
Blanchet, Georges (244)
Blériot, Louis (1)
Blondeau, Gustave (101)
Bobba, Andre (309)
Boillot, Geo. (205)
Boissounas, L. (443)
Boise de Courcenay, Comte (283)
Boivin, Albert (248)
Bonzon, Maurice (355)
Bouvier, Andre (120)
Boyer, Louis (303)
Bregi, Henry (26)
Breguet, Louis (52)
Bresson, Georges (280)
Brinneon, Lucien (277)
Briey, F. de (402)
Brindejonc des Moulinais (449)
Bruneau de Laborie, E. (67)
Bunau-Varilla, E. (16)
Busson, Guillaume (121)
Caille, Albert (200)
Caramanlaki A. (761)
Carles, Fernand (362)
Carlin, L. V. (554)
Casdron, Rene (180)
Cayla P. (458)
Chailliey, Henri (63)
Challe, M. J. (523)
Champel, Florentin (94)
Chanteloup, P. (549)
Chapelle, J. (547)
Charpentier, Louis (286)
Chassagne, Jean (160)
Chausse, P. (519)
Chaussier, Piere (384)
Chatain, Marius L. (267)
Chatain, L. M. L. (296)
Chateau, Edouard (135)
Chaunac-Lenzac de (394)
Chemet, Geo. (159)
Cheuret, Leon (62)
Chevret, L. (62)
Chevalier, J. (515)
Chevalier, Louis (333)
Chevillard, Maurice (385)
Chioni, Basile (250)
Chev, Paul A. L. (465)
Clement M. (108)
Collardeau, Geo. (293)
Collieux, M. (85)
Collin, Georges (279)
Conard (647)
Contard, Paul (351)
Contenet, Henri (447)
Contour, Ernest (371)
Contre (657)
Cordonnier, Robert (221)
Curso, E. (529)
Crochon, Andre (43)
Cronier, Andre M. H. (352)
Cugnet, Gaston (140)
Cure, Gaston M. (242)
Daillens, Jean (119)
Dancourt P. H. (520)
Debener, M. (562)
Deletang, Fernand (42)
Delacroix, Maurice (452)
Delagrange, Robert (366)
De La Roche, Mde (36)
Delobe, R. D. (526)
Denis, Auguste (380)

FRENCH AVIATORS—PRIVATE.—*(continued.)*

Deroy, Francis (374)
Derry, Leon (254)
Derrissy, Andre (376)
Despres, E. M. L. (527)
Deschamps de Bois Hébert (401)
Didier, A. (77)
Divetain, Pierre (466)
Driancourt, M. L. (525)
Dubonnet, Emile (47)
Ducoveneau (456)
Dufour, Jean M. R. (457)
Dufour, Jean (96)
Dufour, Louis (185)
Duval, E. (118)
Duval, Emile (118)
Echeman, P. M. (466)
Esmault-Pelterie, R. (4)
Esquenet, Dr. G. (532)
Farman, Henry (5)
Farman, Maurice (6)
Fiorellimo, Louis (369)
Florencie, Jean (201)
Fournie, J. P. S. (502)
Frantz, Joseph (363)
Francq, Baron de (481)
Frey, Alfred (48)
Frey, Andre (93)
Froussart, Ernest (350)
Frugier, Leon (578)
Gaget, Joseph (335)
Gaillard, J. O. C. (504)
Gallie, Fernand (343)
Gardey, M. (482)
Garros, Roland (147)
Garsonnin, L. (555)
Gastinger, Edouard M. (455)
Gassnier, René (39)
Gassier, Marcel (392)
Gasnier, Pierre (391)
Gaudart, Louis (228)
Gaulard, Charles (302)
Gautheron, Louis (449)
Gaye, Georges (251)
Gilsert, Louis (92)
Gilbert, Eugene (240)
Girard, Etienne (495)
Glorieux, Leon (188)
Gobe, Armand (102)
Gobron, Jean (7)
Goffin, Marcel (284)
Gougsenheim, P. (588)
Goux, Jules (398)
Gournay, Henri (186)
Goys de Mereyrac, Louis (354)
Grandjean, E. C. H. (469)
Grandseigne, R. (360)
Granel, Marcel (174)
Grellet, Alexis (370)
Gressard, M. (725)
Gue, Albert (216)
Guerre, Henri (444)
Guidard, V. P. (487)
Guilbaud, C. J. (518)
Guillemard, T. (445)
Guillaume, C. (651)
Haimaux, Marcel R. (239)
Hanriot, Marcel R. (239)
Hanriot, Rene (368)
Herbster, Maurice (41)
Herveu, Mlle. Jane (318)
Hesne, Paul (113)
Houlette, Andre (367)
Jacquemart, G. C. (464)
Jambler, Paul A. (266)
Janoir, L. (553)
Joliot, André (392)
Joly, C. E. M. (530)
Julleriot, Henry (61)
Junod, Auguste (253)
Kauffman, Paul (198)
Kergarion, Engard de
Kieffer, C. E. (565)
Kummerling, A. (372) (291)
Kocehlin, Jean P. (203)
Kuhling, Paul L. (156)
Labuschere, Rene (86)
Labouret, Rene (222)
Lacombe, P. (534)
Ladougne, Emile (81)
Lafarge, Henri (278)
Lajous, Francois, A. (463)
Lambert, Conte de (8)
Langhe, Armand de (204)
Lastours, H. R. de (552)
Larfinty-Tholosan, Marquis Jules (468)
Larsche, Mme. Raymonde (36)
Latzel, J. (709)
Leblanc, Alfred (17)
Leconte, Henri (320)
Legagneux, Georges (55)
Le Lasseur de Ranzay, G. (479)
Lemartin, Theodore (249)
Lenfant, Louis (386)
Leonet, B. L. (485)
Leprince, P. (494)
Lesieis, Eugene (176)
Lesseps, Jacques de (27)
Leyat, Marcel (564)
Lieutard, H. (497)
Liger A. (573)
Lombardi, Henri (241)
Loridan, Marcel (224)
Magnan, Leon (570)
Magneval, Gabriel (359)
Mahieu, Georges E. (123)
Mallet, J. A. P. (490)
Mamet, Julien (18)
Marchal, Anselem (328)
Marcu, P. H. (405)
Marquery, Rene (238)
Martin, Edouard (365)
Martin, Xavier (102)
Martinet, Robert (78)
Marvingt, Marie (281)
Manvais, Jean (144)
Metrot, Rene (19)
Meyer, Jules M. (229)
Mignot, Robert (76)
Miltgen, Paul (539)
Moineau, R. L. (554)
Mollia, Henri (172)
Montalent, O. de (569)
Montjou, Guy de (446)
Mollizet, Elie A. (57)
Molon, Jean (225)
Molon, Louis (234)
Molon, Lucien (235)
Montigny, Alfred de (69)
Moranc, Leon F. (54)
Morelle, Edmond (35)
Morel, P. F. (524)
Morin, Roger (306)
Mouthier, Louis (157)
Mousnier, Yvon (454)
Niel, Albert (404)
Niel, Mme. Marthe (220)
Nissole, Edouard (583)
Noe, A. G. M. (498)
Noel, Andre (122)
Obre, Emile (148)
Ors, Jean (382)
Orns, Maurice (256)
Osmon, Geo. (361)
Paillette, Marcel (99)
Paillole, E. C. L. (556)
Palade, Antoine (387)
Pallier, Mdlle.
Parent, Francois (189)
Paris-Leclerc, Max (190)
Partiot, G. (516)
Pascal, Ferdinand (301)
Paul, Ernest (91)
Paulhan, Louis (10)
Pequet, Henri (88)
Perin, Albert (161)
Perryon, Edmond (311)
Perrigot, J. (499)
Picard, Pierre (174)
Planchet, Edmond (319)
Poillot (182)
Pommier, Martin (406)
Porcheron, L. A. (471)
Pouleriguen, F. (349)
Pommet (576)
Pourpe, Marc
Pourpe, M. M. E. A. (560)
Prevost, M. (475)
Prevoteau, G. (507)
Prier, Pierre (169)
Raoloh, Jean (386)
Reimbert, Ernest (375)
Reichert, Henri (377)
Renaux, Eugene (139)
Renaud de la Fregeolere (396)
Rey, P. A. P. (517)
Reymond, Senator
Richet, A. (537)
Rigal, Victor (99)
Rivolier, Jean (381)
Robillard, G. de (184)
Robinet, J. (476)
Romance, F. de (288)
Rougier, Henry (11)
Ruby, F. L. (514)
Ruchonnet (127)
Sallard, H. (794)
Sallenave, Henri (66)
Savary, Robert (112)
Schlumberger, M. (316)
Sée, Raymond (187)
Servies, Jules (218)
Simon, Rene (177)
Sommer, Roger (29)
Tabateau, Maurice (128)
Taurin, Andre (84)
Tetard, Maurice (79)
Thieulin, Joseph (459)
Tissandier, Paul (13)
Tixier, Henri (397)
Toussin, Rene (56)
Train, Emile Louis (167)
Vallier, Edmond P. (269)
Vallon, Rene (109)
Van Gaver, Paul (338)
Vasseur, Narcisse (282)
Vedrines, Jules (312)
Vendrines, E. (536)
Verliac, Adrien (129)
Vergmaati, O. (561)
Verrier, Pierre (300)
Verseppu, Leon (149)
Vialard, Charles (342)
Vidart, Rene (153)
Villeneuve Trans, Louis de (285)
Vimard, E. (484)
Visseaux, Henri (217)
Vittoz-Gallet, G. (500)
Wagner, Louis (83)
Walleton, Louis (304)
Weiss, H. (73)
Wintrebert, Henri (300)
Zens, Ernest (28)

The following French aviators have been killed :—

1909.
Ferber, Capt.
Lefebvre, E.

1910.
Blanchard (215)
Delagrange, Leon (3)
Le Blon (38)
Poillot (182)

1911.
Baque
Bourneque, P. M.
Byasson, Lt.
Camine, Capt.
Caumont, Lieut. (156)
Carron, Capt.
Chotard, Lieut.
De Grailly, Lieut.
Despar met, J. (451)
Dupuis, Lieut.
Gaubert (59)
Grailly, Lieut. de
Laffont, A. (111)
Landron
Lantheaume, Lt.
Leforestier
Level
Liere, Louis
Loder, Lt.
Madiot, Capt. (106)
Mommlin
Nicuport, E. (105)
Noel
Princeteau, Lt. (331)
Ruchonnet
Tarron, Capt.
Vallon, Rene
Wachter, C. L. (53)

Note.—For 1912 see next page.

Adam-Gironne (818)
Arondel, P. (827)
Audenis, C. (788)
Badet (622)
Balighant, G. (588)
Barbaroa, M. (702)
Basano, F. (828)
Baudric, E. (609)
Bedel, R. (668)
Beatrix, C. (781)
Benoit, O. (771)
Benoist, G. (667)
Bertin, L. (801)
Blaignan (633)
Bleu, Le. (643)
Boiteux, G. (833)
Boerlage (666)
Bordage, A. (650)
Boucour (678)
Boucher, F. (690)
Borie, A. (803)
Brocard, A. (770)
Brodin, E. (838)
Brouard, E. (807)
Bruginere, A. (813)
Cailleaux, A. (617)
Carreard, G. (779)
Castellan, E. (639)
Cavalier, M. (764)
Caye, M. (672)
Cerantes, F. (611)
Chabert, V. (631)
Chandenier, L. (804)
Coblyn, L. (735)
Contre (657)
Corsini, A. (654)
Cornier, R. (605)
Coville, F. (594)
Couffin, L. (619)
Dambricourt, J. (773)
De Beaussire de Seyssel (756)
Debroutelle, P. (806)
De Chabot, P. (783)
De Genesac, A. (836)
De Lareinty Tholozan H. (822)
Delacour, J. (602)
Delamay, P. M. (635)
Deleraye, M. (790)
De l'Escaille (791)
Delmas, M. (857)
De Marmies, R. (663)
De Maanrkiewicz W. C. (707)
Denhaut, F. (690)
Des Pres de la Morlais (636)
De Pontac (596)
De Reals, R. (686)
De Ryk (Mme. B.) (652)
De Segonac, R. (669)
Desille, L. (581)
De Vergnette, C. (792)
De Villepin, O. (832)
Do Huu, T. (649)
Droubet, F. (727)
Dussot, A. (733)
Dutertre, C. (748)
Ecomand, G. (714)
Ehrmann, L. (646)
Escot, P. (624)
Eymien, S. (726)
Fassin, F. (844)
Fauconpre, L. (814)
Fleiche, L. (729)
Fondre, R. (808)
Foulquier, M. (772)
Francois, A. (665)
Galon, S. (615)
Garron, R. (811)
Glaize, F. (845)
Godot, J. (815)
Grazzioli, A. (687)
Grasset, A. (800)
Greppo, J. (676)
Guerre, P. (730)
Guillaux, E. (749)
Hanne, A. (681)
Helen, E. (586)
Hembert (662)
Hurard, J. (757)
Hustinx, C. (716)
Irate, G. (655)
Jacquin, A. (582)
Jailler, L. (682)
Jeannerod, H. (696)
Jeansoulin, L. (703)
Joachim, H. (610)
Jourjon, R. (841)
Junquet, P. (621)
Kormann (789)
Lambert, A. (618)
Lanier, P. (684)
Lantheaume, C. (616)
Latzel, J. (700)
Le Bleu, P. (643)
Leclerc, P. (593)
Lefebvre, L. (691)
Lecontellec, H. (810)
Lenfast, P. (731)
Lemoine, A. (632)
Leroy, J. (658)
Lesne, M. (796)
Levasseur, J. (743)
Le Vassor, J. (704)
Lewis, J. (642)
Loubignac, L. (793)
Lumiere, G. (840)
Madon, G. (595)
Magnin, L. (648)
Maicon, A. (695)
Mandelli, P. (762)
Manger, D. (750)
Malecaze, J. (776)
Mancarot (710)
Mazier, I. (634)
Melin, E. (699)
Metairie, A. (689)
Mouroux, J. (724)
Navarre, A. (584)
Noel, L. (656)
Nove-Josserand (825)
Olivier, L. (556)
Pasquier, Baron R. (728)
Penet, H. (809)
Pia, G. (829)
Picard, F. (601)
Poulet, E. (709)
Radisson, V. (834)
Raulet, F. (658)
Richer, H. (607)
Ridont, R. (817)
Roussel, L. (650)
Roux, H. (715)
Saint-Michel Rivet (604)
Sallard, H. (794)
Sauson de Sausal (812)
Schneegans, C. (712)
Senart, J. (661)
Sensever, H. (580)
Senougue, A. (823)
Serant, L. (679)
Seyrat, J. (830)
Shigeno, K. (744)
Soularis, M. (698)
Soyer, H. (671)
Testulat, P. (821)
Thierry de Ville d'Avray (579)
Thoret, J. (708)
Tierch, M. (645)
Tournier, A. (677)
Trescartes, L. (842)
Vallet, C. (734)
Vandelle, R. (785)
Vandinck, A. (787)
Vandal, P. (598)
Ventre, L. (585)
Vidal Soler, E. (686)
Vegoyeau, A. (755)
Whitehouse, W. (589)
Zens P., (675)
Zorra, L. (653)

Killed.

1912.
Arondel
Barillon (307)
Bedell, R.
Bernard, Suzanne
Boerner, Lieut.
Boncour, Lieut.
Barie
Bressand, Lieut.
Chanteriers, Lieut.
Dubois, Capt.
Ducourneau, Lieut.
Echeman, Capt.
Etienne, Lieut.
Faure, Capt.
Frey, H.
Jost, Capt.
Kimmerling
Lacour
Laffont
Level
Le Lasseur de Ranzay
Laurent, Maréchal des L.
Lemartin, T.
Madiot, Capt. (106)
Maguet, Capt. le
Maréchal, M. des Logis
Maron
Nieuport, C.
Noel
Olivers, G.
Peignan, Lieut. A.
Pouillet, E.
Paillole
Poutrin, Lieut.
Princeteau, Lieut.
Robillard-Cosnac, Comte de
Roby
Ruchonnet
Seveille, Lieut. H. P
Tarron, Capt.
Thierry de Ville d'Avray, Lieut.
Thomas, Lieut.
Vallon, R.
Visseur
Wachter, C.
Wagner, A.

Up to end of March, 1914.

Alliot, (1493)
Alziex, J. (1232)
Andoyer, A. (1487)
Argentere, C. (1397)
Argouges, A. (1538)
Auger, A. (1410)
Aullen, M. (1374)
Autin, J. (1527)
Bacheler, J. (1349)
Back-Vary, E. (1254)
Bagnol, R. (1360)
Baliencourt, A. de (1406)
Barbier, J. (1478)
Barbot, J. (1288)
Battesti, F. (1501)
Battini, L. (1263)
Baudry, J. (1554)
Baulaincourt, A. de (1576)
Baumont, M. (1385)
Beauvais, J. (1259)
Begoui, L. (1411)
Bequet, M. (1294)
Berger, P. (1459)
Bernard-Thierry, M. (1269)
Bertin, L. (1233)
Besson, R. (1343)
Bienaime, M. (1523)
Bienaimé, R. (1537)
Bigeur, G. (1201)
Bigot, E. (1505)
Biot, M. (1399)
Blaumont (de) (1203)
Blondetti, V. (1526)
Blot, L. (1273)
Boland, G. (1378)
Bonnefoy, R. de (1204)
Bonnéte, E. (1408)
Bonnetéte, L. (1384)
Borde, A. (1330)
Bordet, L. (1552)
Bourgeois, A. (1372)
Bourhis, J. (1297)
Brehier, L. (1496)
Bretonnière, M. (1332)
Breuil, E. (1364)
Bridon (1242)
Bron, G. (1347)
Brugnior, P. (1569)
Brullard, X. (1366)
Brun, H. (1461)
Budig, F. (1438)
Caramacheseo, N. (1383)
Carbon, R. de (1307)
Carnon, C. (1321)
Cartaud, P. (1298)
Cassin, E. (1253)
Castel, E. de (1539)
Cervetti (1405)
Chagnot, R. (1407)
Chalambel, J. (1359)
Chapier, L. (1301)
Charamelet, E. (1453)
Chaudeur, A. (1306)
Chauson, A. (1241)
Chevrier, P. (1322)
Charysse, L. (1345)
Clement, M. (1357)
Colard, C. (1199)
Colombier, R. (1532)
Coquelin, F. (1260)
Corbeu, E. (1547)
Cornuat, M. (1481)
Costantini, D. (1395)
Courriere, P. (1387)
Coutinsou, A. (1306)
Damedor, Mademoiselle C. (1449)
Dauphin, P. (1333)
David, R. (1340)
Dedergue, L. (1227)
Delafond, M. (1579)
Dekeanp, A. (1247)
Desaitier, J. (1436)
Destrem, A. (1425)
Diaz-Deitz, M. (1224)
Didier, P. (1331)
Dorsemaine, A. (1308)
Dortu, P. (1480)
Doucker, F. de (1255)
Dreux-Brézé, E. de (1443)
Dufort, P. (1507)
Dupont, L. (1290)
Dupuis, L. (1561)
Duran, J. (1474)
Durand de Prémorel (de) (1344)
Duyck, C. (1469)
Ehrler, M. (1516)
Esperon du Tremblay, V. (1424)
Esser, L. (1418)
Eoryale, E. (1398)
Fabre, E. (1415)
Fabry (1559)
Faucher, A. (1334)
Faure, E. (1285)
Faure, J. (1231)
Faure, M. (1396)
Faurité, M. (1485)
Faux, C. (1534)
Fenesch, A. (1304)
Feto, A. (1562)
Flamant, J. (1528)
Fortier, R. (1490)
Foucher, P. (1197)
Fougeroux, G. (1380)
Frobert, J. (1377)
Gabbin, A. (1412)
Garnier, F. (1329)
Gaudron, J. (1472)
Genevois, L. (1376)
Germain, R. (1336)
Gillet de Chalonge, M. (1225)
Girier, C. (1205)
Golfier, C. (1200)
Gautorbe, M. (1473)
Grandy, G. (1358)
Griballet, L. (1346)
Grosourdy de Saint-Pierre, G. de (1370)
Guichard, R. (1375)
Guidon, G. (1487)
Guignand, U. (1442)
Guillabert, L. (1323)
Haurinet, M. (1361)
Harcourt, J. d' (1275)
Hennion, P. (1577)
Henriot, M. (1513)
Hervé, I. (1261)
Hocfeuille, A. (1246)
Hostein, W. (1256)
Houssemand, C. (1555)
Jacolin, A. (1431)
Inouyé, F. (1484)
Jacquemont du Donjon, N. (1273)
Jacquemand, M. (1457)
Jadas, M. (1482)
Janet, R. (1284)
Janvier, E. (1303)
Jenson, L. (1402)
Junel, G. (1328)
Jupin, R. (1426)
Kernels, J. (1573)
Labbaye, C. (1498)
Labeille, H. (1509)
Laboueillie, E. (1280)
Laborde, J. de (1312)
Lacoste, P. (1388)
Labobe, L. (1327)
Laissardière, J. de (1251)
Laitre, L. de (1326)
Lanier, L. (1517)
Lartigue, H. (1304)
Lartigue, P. (1271)
Lashermes, G. (1416)
Lasnier, J. (1244)
Laurens, R. (1266)
Laurent, J. (1563)
Lavorlochere, P. (1313)
Lavilette, Guy de (1338)
Laynel, G. (1575)
Leclerc, G. (1198)
Lecompte, J. (1503)
Legardieur, M. (1285)
Legendre, L. (1216)
Legras, A. (1218)
Lehugeur, H. (1512)
Lenoir, M. (1564)
Le Reverend, A. (1238)
Lesech, R. (1393)
Leseompte, A. (1305)
Liénhard, G. (1352)
Lorea, F. (1557)
Loste, J. (1533)
Maguet, A. (1486)
Maire, M. (1276)
Mallet, M. (1440)
Malliez, H. (1499)
Mandineaud, M. (1500)
Mangeot, G. (1479)
Maquer, M. (1413)
Marmier, P. de (1565)
Marques, M. (1203)
Marvillet, G. (1373)
Matheron, A. (1319)
Mauger, R. (1325)
Maunoury, F. (1400)
Menadier, A. (1531)
Megin-Lécreulx, G. (1356)
Mennerat, A. (1351)
Merat, E. (1303)
Mere, P. (1217)
Messenier, L. (1341)
Mouilleron, P. (1240)
Moutach, H. (1279)
Muiron, E. (1530)
Nardin, C. (1320)
Nautel, J. (1558)
Neufville, R. de (1387)
Ollaguier, E. (1257)
Or, F. d' (1277)
Palisson, D. (1489)
Pegoud, C. (1243)
Pelletier, L. (1556)
Pelletier-Doisy, G. (1274)
Perriand, J. (1444)
Perrin, C. (1409)
Perron, G. (1454)
Petitierossi, S. (1228)
Phillippe, A. (1545)
Pierre, R. (1337)
Pierron, A. (1504)
Plagino, Mdme. H. de (1399)
Poggi, M. (1367)
Poirson, G. (1223)
Poivre, M. (1232)
Pommelie, G. de la (1524)
Poulain, P. (1339)
Preyvon, R. (1249)
Proyillard, E. (1463)
Pulpe, E. (1571)
Quenel, N. (1262)
Quillery, J. (1368)
Quillien, N. (1239)
Rabastel, J. (1222)
Ragon, L. (1226)
Rain, de (1235)
Rateau, J. H. (1423)
Raympnd, C. (1362)
Regnault, H. (1417)
Remia, A. (1365)
Revel-Tissot, C. (1248)
Richer, Mdme. M. (1369)
Romine, C. (1295)
Ronseray, P. de (1219)
Rorien, M. (1540)
Rose, J. (1464)
Rost, M. (1234)
Saint-Lague, R. (1270)
Salze, G. (1560)
Sauxay, A. (1579)
Savel, J. (1535)
Schemmel, C. (1291)
Schneider, P. (1302)
Simon, A. (1536)
Simon, C. (1299)
Sivel, G. (1215)
Soubies, A. (1466)
Souriol, A. (1379)
Strilyck (1465)
Style, M. (1488)
Taillepied de Bondy (1265)
Tanassesev, A. (1414)
Tasdhomme, L. (1574)
Thebault, L. (1506)
Thebault, G. (1510)
Thiarau, M. (1317)
Thomas, L. (1289)
Thomass, R. (1439)
Thomassin, G. (1311)
Theier, G. (1283)
Touvet, A. (1264)
Trepp, M. (1196)
Trouve, G. (1542)
Tucapel, P. (1460)
Turmeny, O. (1548)
Val, A. (1220)
Van Hoowe, H. (1342)
Varein, H. (1572)
Vardon, E. (1296)
Vasselot, de R. (1310)
Vayssieres, F. (1371)
Venson, P. (1278)
Venturini, M. (1392)
Verwitch, L. (1543)
Vial, J. (1241)
Vialle, M. (1405)
Vuillemin, J. (1522)
Wald, H. (1492)
Winter, G. (1335)
Zarapoff, C. (1498)

Killed.

1913.

Autroche, Caporal G. d'
Bresson, Lieut.
Battini, Sergt.
Berode, Enseigne de V.
Bertin, Pere
Bertin, Fils
Briault, Lieut.
Canal, Marechal des logis
Cezes, Lieut.
Chanroux, Marechal des logis
Clavenad, Capt.
Corbon
Debeverm Sap
Faure, Adjt.
Foulquier
Garnier, Lieut.
Gaudart
Hurtard, Lieut.
Kreydon, Lieut.
Lagarde, Capt. de
Laverlochere, Sap
Letort
Montalent, de
Nieuport, C.
Noue, Capt de
Parisot
Perreyon
Porteau, Lieut.
Richy, Sergt.
Senart
Sensever, Lieut.
Sivel
Soulieliand, Lieut.
Vasselot, de R., Lieut. de

A

AERIENNE. L'Aerienne, 25 Quai des Grands Agustins, Paris. Builds to specifications and supplies all parts.

ANTOINETTE. Company has ceased to exist.

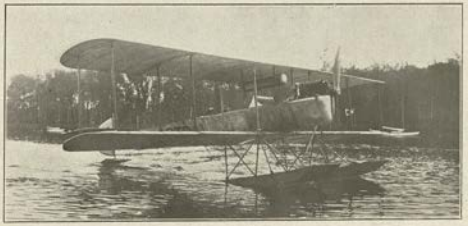
ASTRA. "Astra" Soc. de Constructions Aéronautiques. (Anciens Etabs. Surcouf) Soc. Anyme 13 Rue Conchat, Billancourt (Seine). Works: 121-123 Rue de Bellevue, Billancourt. Flying grounds: Issy-les-Molineux Villacoublay (S.&-O). This old established balloon and dirigible firm first took up aviation as French agents for the *Wrights* in 1909. For a time they built *Wrights* with certain modifications, but by 1912, little save the Wright system of warping remained. Capacity: about 100 machines a year.

		Biplane type C. **1912-13.** Wood.		Military biplane, type C.M. **1912-13.** Wood.		Biplane, type C. **1913.** Wood & steel.		Mil. biplane, type C.M. **1913.** Wood & steel.		Hydro-biplane, type C.M. **1913.** Wood & steel.	
Length	feet (m.)	34	*10·40*	36	*10·97*	34	*10·40*	36	*10·97*	32¾	*10*
Span	feet (m.)	41	*12·50*	40½	*12·32*	41	*12·50*	40½	*12·32*	39½	*12*
Area	sq. feet (m^2.)	519	*48·2*	519	*48·2*	519	*48·2*	519	*48·2*	519	*48·2*
Weight ...	machine lbs. (kgs.)	1764	*800*	2365	*1073*	..		1411	*640*	1763	*800*
	useful, lbs. (kgs.)	661	*300*	882	*400*	...		...		*(unladen)* ...	
Motor	h.p.	50 Renault		75 Renault or 75 Clerac		50 Renault		75 Renault		100 Renault	
Speed ...	max. m.p.h. (km.)	56	*90*	56	*90*	56	*90*	56	*90*	56	*90*
	min. m.p.h. (km.)	...		...		...		...		...	
Endurance	hrs.	...		...		...		...		...	

Remarks.—The 1912-13 and 1913 types differ only in the adoption of metal in the 1913 models, which are consequently considerably lighter.

General features.—Warping wings. Fixed tail planes with two elevators in rear. Single rudder. Single tractor geared down 1 to 2. Type C carries 85 litres petrol; type C.M., 137 litres.

Astra. Military "C.M." 1913.



Astra. Hydro-avion, 1913.

B

BATHIAT-SANCHEZ. Aeroplanes Bathiat-Sanchez, 92, Rue Jean-Jacques Rousseau, Issy-les-Moulineaux (Seine). School: Bouy (Marne). Successors of Roger Sommer. Output capacity: 100 machines a year.

1914 Models.

		Biplane (D). 2-seater.		Monoplane (E). 1-seater.	
Length	... ... feet (m.)	33	*10·10*	23¾	*7·10*
Span	... ... feet (m.)	44½	*13·50*	29½	*8·90*
Area	... ... sq. feet (m^2.)	495	*46*	172	*16*
Weight	machine...lbs. (kgs.)	1215	*550*	640	*290*
	useful ...lbs. (kgs.)	607	*275*	331	*150*
Motor	... . h.p.	80 Canton-Unné		50 Gnome	
Speed	max. m.p.h. (km.)	65	*105*	72	*115*
	min. m.p.h. (km.)	40	*65*	50	*80*
	ase. f.p.m. (m.)	999	*83*	410	*125*

Notes.—Monoplane: Wood construction, warping wings, 2 wheels.
Biplane: Steel construction, ailerons, 4 wheels, 1 skid.

Monoplane.

Biplane.

B—*continued.*

BLERIOT Monoplanes. L. Bleriot, "Bleriot-Aeronautique," 39, Route de la Révolte, Paris-Levallois. Flying grounds: Buc, Pau, and Hendon (England). Output capacity: 400 a year. L. Bleriot began to experiment in 1906, along Langley lines. By 1909 he was one of the leading French firms; and the first cross Channel flight was made by him.

Details of 1914 standard types:—

		XI 1-seater.	XI.—2 2-seater.	XI.—2 Hydro	39 Armoured	43 2-seater.
Length	feet (m)	25½ *7·80*	27½ *8·400*	29½ *9*	20½ *6·15*	20 *6·13*
Span	feet (m)	28 *8·50*	33½ *10·250*	36½ *11·03*	33 *10·10*	33 *10·10*
Area	sq. feet (m²)	150 *14*	215 *20*	226 *21*	205 *19*	207 *19·3*
Weight ...	unladen, lbs. (kgs)	660 *300*	770 *350*	1100 *500*	925 *420*	770 *350*
	useful ...lbs. (kgs.)	330 *150*	607 *275*	550 *250*	385 *175*	607 *275*
Motor	h.p.	60 { Gnome & Le Rhone	80 Gnome	80 Le Rhone	80 Gnome	80 Gnome
Speed ...	max. m.p.h. (km.)	68 *110*	75 *120*	68 *110*	78 *125*	78 *125*
	min. m.p.h. (km.)	... ...	... ...	... ...	... ...	... ...
	asc. f.p.m. (m.)	490 *150*	230 *70*	197 *60*	328 *100*	470 *143*
Endurance	hrs.	...	...	...	...	...

Note.—The monos., as usual, are of wood construction; wheels only for landing. Rectangular section bodies. Warping wings, elevator in rear. Hydros fitted with self-starters.

Type XI—2.

Type XI.

Type 43.

B—*continued.*

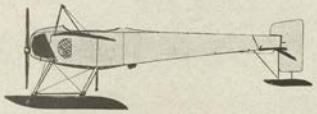
BOREL. G. Borel & Cie, 25 rue Brunel, Paris. Established 1910. Capacity: about 25 machines a year.

Model.	1913. Monoplane.	1913. Monocoque racer.	1913. Hydro-mono. 2-seater.
Length	22 feet (6·70 m.)	19 feet (5·80 m.)	27 feet (8·30 m.)
Span	30 feet (9·15 m.)	26 feet (8·00 m.)	37 feet (11·25 m.)
Area	152 sq. ft. (14 m²)	116 sq. ft. (11 m²)	237 sq. ft. (22 m²)
Weight { total ...	530 lbs. (240 kgs.)	608 lbs. (276 kgs.)	880 lbs. (399 kgs.)
Weight { useful ...	287 lbs. (130 kgs.)	...	...
Motor	50 Gnome	80 Gnome	80 Gnome
Speed ... (p.h.)	71 m. (115 km.)	94 m. (150 km.)	62 m. (100 km.)

Note.—The monocoque is of wood and steel construction, the others wood only. The monocoque has canoe body, the others ordinary rectangular section. Floats of the hydro as illustrated. For the rest the ordinary mono. is practically on the same lines as the 1912. The racer is somewhat on *Deperdussin* lines, but the body is built up inside. No fixed tail. The hydro. is an enlarged edition of the mono. Floats display nothing very original, except that a float under tail is interconnected with the rudder, and that the two front floats are fitted for being rowed. Fitted with a self-starter.

Hydro-avion.

There is also a Deuhaut design, 1913, about the same as a *Donnet-Leroque*.



1913 BOREL Hydro-avion. *By favour of "Flight."*

BOREL Monocoque.

B—*continued.*

BREGUET. Soc. Anonyme des ateliers d'aviation, Louis Breguet, 16 Boulevard Vauban, Douai (Nord). Capacity: about 200 machines a year. Paris office: 25, Boulevard Jules Sandeau. Works at La Brayelle, près Douai, Villacoublay, près Paris. *School:* Villacoublay. Capacity: 150 machines a year.

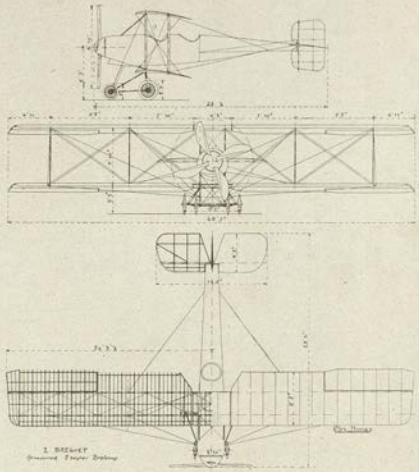
1914 models.	H.I. U3. 2-seater, hydro.	A.G.-4. Armoured.	T.O.-2. 2-seater.	Bristol. 2-seater.
Length ... ... feet (m)	33½ *10·30*	28½ *8·60*	25½ *7·80*	29½ *8·90*
Span ... ... feet (m)	60½ *18·50*	50 *15·25*	36 *11*	37½ *11·50*
Area ... ... sq. feet (m²)	780 *72·5*	600 *56*	422 *39·2*	426 *39*
Weight ... empty, ... lbs. (kgs.)	2650 *1200*	2100 *950*	990 *450*	990 *450*
Weight ... useful ... lbs. (kgs.)	1100 *500*	880 *400*	607 *275*	550 *250*
Motor ... ... h.p.	200 Canton Unné.	140	80 Gnome	80 Le Rhone
Speed ... max. m.p.h. (km.)	75 *120*	75 *120*	75 *120*	71 *115*
Speed ... min. m.p.h. (km.)	44 *70*	40 *65*	40 *65*	34 *55*
Speed ... asc. f.p.m. (m.)	220 *67*	328 *100*	505 *154*	573 *175*
Endurance ... ... hrs.	..	...	...	...

In each case.—

Construction.—All steel.

Landing chassis.—Consists of 4 wheels without skids, fitted with patent "Oleopneumatic" shock absorbers and spring suspension.

Note.—For photos see next page.



B—*continued*

BREGUET.—continued.

Biplane. Military 2-seater.

Bristol Biplane.

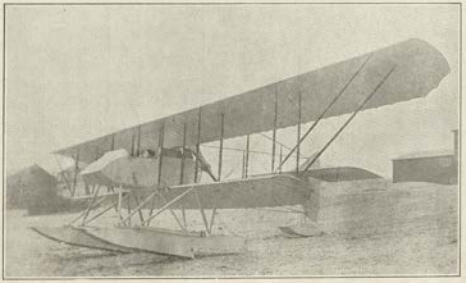
C

CAUDRON. Caudron Frères, Rue (Somme). *School*: Le Crotoy (Aerodrome de la Baie de la Somme). Capacity, about 200 a year.

1914 models.	F. 1-seater.		G 2. 2-seater.		L. Hydro.	
Length ... ... feet (m.)	31½	9·65	38⅞	12·10	47½	14·60
Span ... ... feet (m.)	21½	6·50	23¾	7·25	27½	8·30
Area ... ... sq. feet (m²).	236	22	300	28	387	36
Weight ... machine lbs. (kgs.)	660	300	880	400	1435	650
... useful lbs. (kgs.)	440	200	660	300	770	350
Motor ... ... h.p.	60 Le Rhône		80 Le Rhone / Gnome		100 Gnome	
Speed ... max. m.p.h. (km.)	71	115	66	106	59	95
... min. m.p.h. (km.)	32	52	32	52	37	60
... use. f.p.m. (m.)	657	200	545	166	122	38

Notes.—Wood construction, flexible wings.
Landing gear: two skids and four wheels.
Hydros on wheels as well as floats (special Caudron patent).
Lateral control: warping.
Enclosed body.
Fixed tail with two supple elevators in rear.

Military biplane.



Hydro. 2-seater.

C—*continued.*

CLEMENT-BAYARD.

Etablissements Clement-Bayard, 33 quai Michelet, Levallois-Perret (Seine). Capacity: 50 machines a year.

1914 models.		Single-seater monoplane.		2-seater monoplane.		Armoured monoplane.	
Length ... ... feet (m.)		24½	7·50	24½	7·45	20½	6·32
Span ...	upper ... feet (m.)	30	9·20	37½	11·41	33½	10·20
	lower ... feet (m.)	...		...		...	
Area ... ... sq. feet (m².)		172	16	226	21	194	18
Weight ...	total ... lbs. (kgs.)	1146	520	771	350	827	375
	useful ... lbs. (kgs.)	441	200	607	275	386	175
Motor ... ... h.p.		50 Gnome		80 Le Rhone		80 Gnome	
Speed ...	max. m.p.h. (km.)	62	100	68	110	71	115
	min. m.p.h. (km.)	...		...		...	
	ase. f.p.m. (m.)	492	150	410	125	328	100
Endurance ... ... hrs.		...		...		...	

Notes.—*Control*: lateral, warping. Wood and steel construction. Landing chassis two wheels.

D

DEPERDUSSIN.

Etablissements Deperdussin, 19 rue des Entrepreneurs, Paris. School: Courcy-Bethény (Marne). Established 1910. Capacity: about 150 machines a year.

1914 types.		Monocoque single-seater.		2-seater.		Hydro.	
Length ... ... feet (m.)		19½	6·02	24	7·20	29	8·85
Span ... ... feet (m.)		21½	6·60	36½	11·00	44½	13·60
Area ... ... sq. feet (m².)		97	9	226	21	301	28
Weight ...	total, lbs. (kgs.)	991	450	1050	475	1380	625
	useful, lbs. (kgs.)	419	190	550	250	771	350
Motor ... ... h.p.		160 Le Rhone		80 Gnome		100 Gnome	
Speed ...	max., m.p.h. (km.)	131	210	105	170	75	120
	min., m.p.h. (km.)			56	90	53	85
	ase., f.p.m. (m.)	...		247	75	164	50
Endurance ... ... hrs.		...		...		...	

Notes.—Wood construction. Lateral control by warping. Mounted on wheels without skids. Fabric: "Monodep."

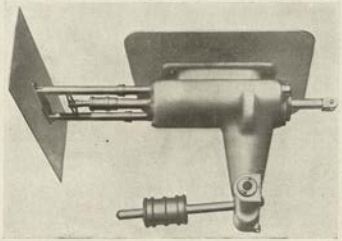
Armoured monoplane.

D—*continued.*

DOUTRE. Soc. Anonyme des Appareils d' Aviation Doutre, 58, rue Taitbout, Paris. *School:* Corbeaulieu pres Compiègne (Seine et Oise).

1914 model.		Biplane 2-seater.	
Length ... ... feet (m.)		37¼	11·50
Span ... ... feet (m.)		52¼	16
Area ... ...sq. feet (m².)		560	52
Weight	machine, lbs. (kgs.)	1370	620
	useful ...lbs. (kgs.)	550	250
Motor ... ... h.p.		70 Renault	
Speed ...	max. m.p.h. (km.)	62	100
	min. m.p.h. (k.m.)	37	60
	asc. f.p.m (m.)	164	50

Notes.—Wood construction. Fitted with the Doutre patent stabiliser, which automatically and instantaneously counteracts troubles due to sudden gusts or partial motor failures. Weight of the 1913 model stabiliser is only 26¼ lbs. (12 kgs.) Landing chassis: four wheels and two skids. Lateral control: ailerons.



Model 1913 stabiliser.

Military 2-seater biplane.

F

FARMAN. Aeroplanes. Henri and Maurice Farman, 167, Rue de Silly, Billancourt (Seine). *School*: Buc, près Versailles and Etampes. Depots: Buc, Etampes (Seine and Oise). Camp de Chalons—Reims. Boulogne-sur-mer. Established by H. Farman in 1908. M. Farman established works a little later. In 1912 the two brothers combined. The present works were opened in January, 1912, and have an output capacity of 350 machines a year.

1914 models	*H. Farman.* **F.20.**	*H. Farman.* **F.22.**	*H. Farman.* **F.22.** hydro.	*H. Farman.* **F.23.**	*H. Farman.* **F.23.** hydro.	*H. Farman.* **F.24.** one-seater.	*M. Farman.* **S.7.**	*M. Farman.* **S.8.** hydro.	*M. Farman.* **S.9.** hydro.	*M. Farman.* **S.11.**
Length ... feet (m.)	26½ *8·00*	29 *8·80*	29 *8·80*	29 *8·80*	29 *8·80*	28½ *8·75*	37½ *11·52*	32 *9·74*	30½ *9·35*	31 *9·48*
Span ... feet (m.)	44½ *13·60*	51 *15·58*	51 *15·58*	59½ *18·08*	59½ *18·08*	37½ *11·50*	51 *15·52*	62½ *12·02*	56 *17·00*	53 *16·13*
Area ... ... sq. feet (m²)	375 *35*	494 *46*	494 *46*	537 *50*	537 *50*	279 *26*	580 *54*	730 *68*	644 *60*	612 *57*
Weight ... { total ...lbs. (kgs.)	804 *363*	849 *385*	1135 *515*	860 *390*	1330 *605*	640 *290*	1280 *580*	2130 *967*	1660 *755*	1215 *550*
Weight ... { useful ...lbs. (kgs.)	606 *275*	716 *325*	606 *275*	880 *400*	606 *275*	385 *175*	607 *275*	881 *400*	607 *275*	660 *300*
Motor ... ... h.p.	80 Gnome	80 Gnome	80 Gnome	80 Gnome	120 Gnome	80 Gnome	70 Renault	100 Renault	70 Renault	70 Renault
Speed ... { max. m.p.h. (km.)	65 *105*	62 *100*	56 *90*	56 *90*	65 *105*	68 *110*	59 *95*	62 *100*	56 *90*	62 *100*
Speed ... { min. m.p.h. (km.)	...	...	...	...	...	...	...	...	...	...
Speed ... { esc. f.p.m. (m.)	235 *71·5*	205 *62·5*	164 *50*	164 *50*	164 *50*	410 *125*	164 *50*	764 *50*	164 *50*	205 *62·5*
Endurance ... ... hrs.	...	...	...	...	...	...	...	...	...	...

Notes.—The hydro-avions are fitted with two narrow floats without steps. Wood and steel construction; ailerons inter-connected. Type "F.20": two skids and four wheels. All other types: four wheels only.

Notes.—Wood construction; ailerons inter-connected. Type "S.7" has elevator forward. All other types have nose. All hydros are fitted with two narrow floats without steps, four wheels and two skids for landing.

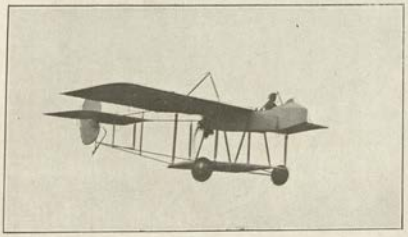
[Continued on next page.

F—*continued.*

FARMAN—(*continued*).

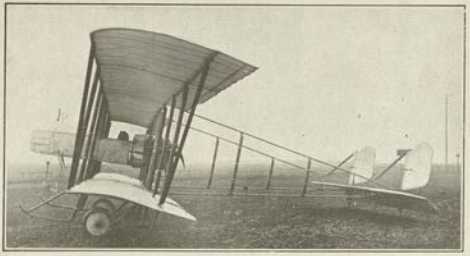
H. FARMAN.

"F-20." Biplane.



"F-24." Biplane.

M. FARMAN.

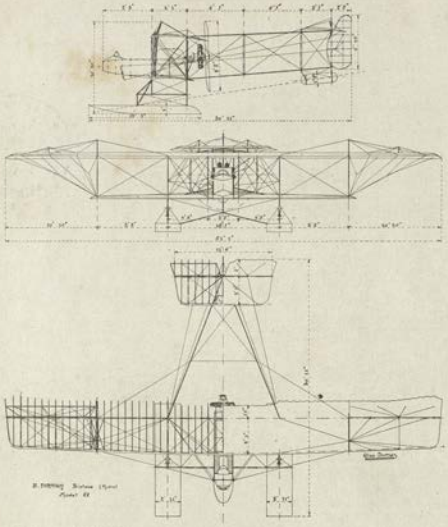


"S-11." Biplane.

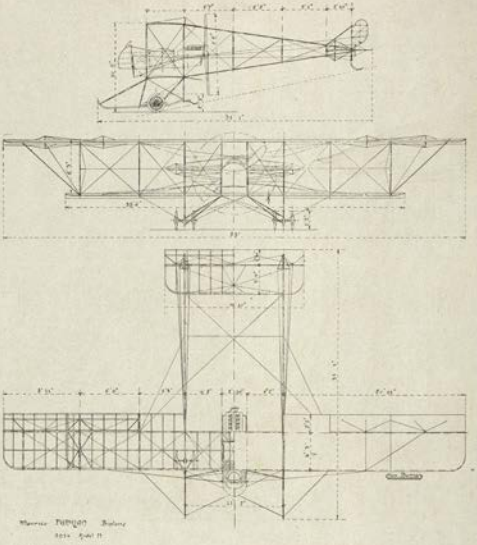
[*Plans, see next page.*

FARMAN—(concluded).

F—*continued.*



H. Farman "F-22." Hydro.



M. Farman "S-11."

F—*continued.*

F.B.A. Franco-British Aviation Co., a Vernon (Eure). Founded 1913, by Beaumont and Shreck, to build the *Donnet-Leroque*. Capacity: small.

	1914 type.	
Length ... ... feet (m.)	25½	7·72
Span ... ... feet (m.)	40½	12·15
Area ... ... sq. feet (m².)	280	26
Weight ... {total ... lbs. (kgs.)	1035	470
{useful ... lbs. (kgs.)	771	350
Motor ... ... h.p.	100 Gnome	
Speed ... {max. m.p.h. (km.)	68	110
{min. m.p.h. (km.)	47	75
{asc. f.p.m. (m.)	164	50
Endurance ... ... hrs.	...	

Remarks, Notes and Details.—One large central boat, 24 feet in length. Two small floats at each extremity of lower plane. Lateral control: ailerons. Motor in gap just below upper plane. Propeller in rear, direct driven.

Hydro.

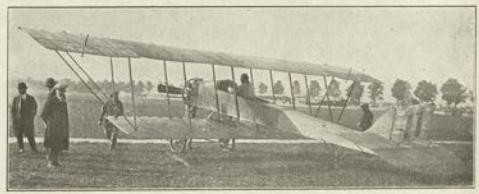
G

GOUPY. Etablissements Ambroise Goupy, 56, Boulevard du Pointy du Jour. *School*: Issy les Molineaux (Seine). Capacity: about 30 machines a year.

	1914 type.	1914. Biplane, single-seater.		1914. 3-seater.	
Length ... ... feet (m.)	22½	6·80	30	9·10
Span ... ... feet (m.)	20½	6·30	41½	12·75
Area ... ... sq. feet (m².)	140	13	323	30
Weight ... {total ... lbs. (kgs.)	618	280	860	390
{useful ... lbs. (kgs.)	285	175	771	350
Motor ... ... h.p.	80 Gnome		100 Gnome	
Speed ... {max. m.p.h. (km.)	81	130	59	95
{min. m.p.h. (km.)	47	75	44	70
{asc. f.p.m. (m.)	492	150	115	35
Endurance ... ... hrs.	...		...	

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

Notes.—Wood construction. Landing chassis: wheels and skids. Lateral control: ailerons. Tractor screw. Staggered planes.



Biplane.

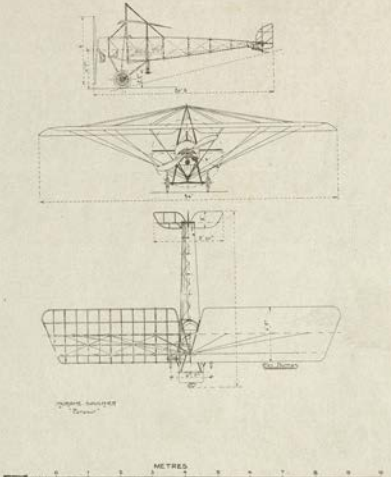
M

MORANE-SAULNIER. Aeroplanes. Morane-Saulnier, Soc. de constructions aéronautiques, 205 Boulevard Pereire, Paris. *School:* Villacoublay. Output capacity: about 100 machines a year.

1914 models.	G.A. 2-seater.		G.B. 2-seater.		Single-seater Armoured.		"Parasol." 2-seater.	
Length ... ... feet (m)	29½	9·00	29½	9·00	29½	9·00	29½	9·00
Span ... ... feet (m.)	39½	12·00	34	10·20	34	10·20	34	10·20
Surface ... sq. feet (m²)	151	14	172	16	172	16	172	16
Weight ... total ... lbs. (kgs.)	705	320	815	370	1080	490	859	380
Weight ... useful ... lbs. (kgs.)	465	210	607	275	342	155	550	250
Motor ... ... h.p.	60 Le Rhone		80 Gnome		80 Le Rhone		80 Gnome	
Speed ... max. m.p.h. (km.)	78	125	76	122	78	125	76	122
Speed ... min. m.p.h. (km.)	56	90	55	89	56	90	55	89
Speed ... asc. f.p.m. (m.)	410	125	345	105	470	143	345	105

In each case **body** is of rectangular section, wood, mounted on wheels only. Lateral control, warping.

"Parasol." 2-seater.



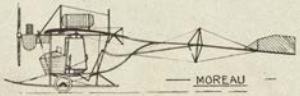
Uniform Aeroplane Scale.

M—*continued.*

MOREAU. Moreau frères, Combs-la-Ville.

Model and date.		1914.	
Length ... ... feet (m)		30½	*9·30*
Span ... ... feet (m)		46½	*14·15*
Area ... ... sq. feet (m²)		345	*32*
Weight ...	machine, lbs. (kgs.)	1125	*510*
	useful ...lbs. (kgs.)	550	*250*
Motor ... ... h.p.		80 Gnome	
Speed ...	max. m.p.h. (km.)	59	*95*
	min. m.p.h. (km.)	42	*67*
	asc. f.p.m. (m.)	329	*100*

Notes.—Fitted with a special stabilising device. Steel and wood construction. Landing gear: skids and wheels. Lateral control: ailerons.



N

NIEUPORT. Soc. Anonyme des Etablissements Nieuport, 46, Boulevard du Point du Jour, Issy-les-Moulineaux (Seine). *School:* Villacoublay (Seine and Oise). Established 1910 by the late Edouard de Nieuport. Approximate capacity of works: 300 machines a year.

1914 Monoplanes.		2-N. 1-seater.		X. 2-seater.		X. hydro.		XI. 50.		XI. 80.	
Length	feet (m.)	23½	*7·15*	27	*8·26*	27½	*8·40*	21½	*6·49*	21½	*6·49*
Span	feet (m.)	28½	*8·65*	40½	*12·32*	41	*12·50*	27½	*8·32*	31½	*9·52*
Area	sq. feet (m²)	150	*14*	247	*23*	252	*23·50*	150	*14*	172	*16*
Weight ... machine	lbs. (kgs.)	529	*240*	880	*400*	1058	*480*	595	*270*	660	*300*
Weight ... useful	...lbs. (kgs.)	352	*160*	704	*320*	630	*290*	385	*175*	495	*225*
Motor	h.p.	30 Nieuport		80	(Gnome / Le Rhone / Clerget	80	Le Rhone	50	Gnome	80	Gnome
Speed ... max.	m.p.h. (km.)	68	*110*	72	*115*	65	*105*	68	*110*	72	*115*
Speed ... min.	m.p.h. (km.)	...		...		...		...		...	
Speed ... asc.	f.p.m. (m.)	...		328	*100*	216	*66*	410	*125*	544	*166*

Notes.—In each case the body is of rectangular section, ash and spruce. Fitted tail plane with two elevators in rear. Warping wings. Type "X1" fitted with two wheels only. All other types fitted with standard type of skid.

Type 2-N.

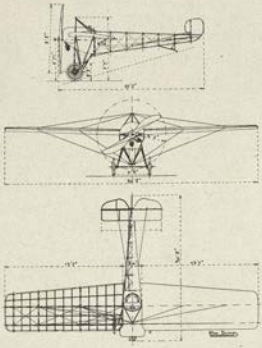
Type X1.

P

PONNIER. Alfred Ponnier, 145, Rue de Neifchatel, Reims (Marne). *School:* Bouy (Camp de Chalons. Successor of the Hanriot Co., established 1908. Output capacity: 150 machines a year.

1914 type.		Scout Monoplane.		Tourist Monoplane.		2-seater Monoplane.		Biplane.		Armoured.		Racer.	
Length	feet (m.)	17½	*5·25*	17½	*5·25*	21½	*6·55*	17½	*5·25*	17½	*5·30*	17½	*5·25*
Span	feet (m.)	29½	*9·00*	30½	*9·20*	36½	*11·20*	27	*8·20*	34½	*10·55*	21	*6·46*
Area	sq. feet (m².)	129	*12*	150	*14*	205	*19*	215	*20*	172	*16*	75	*7*
Weight ... total	lbs. (kgs.)	470	*215*	526	*240*	747	*340*	680	*310*	747	*340*	702	*320*
useful	lbs. (kgs.)	351	*160*	395	*180*	603	*275*	395	*180*	395	*180*	...	
Motor	h.p.	50 Gnome		60 Le Rhone		80	Le Rhone Gnome Clerget	50 Gnome		80 Gnome		160 Gnome	
Speed ... max.	m.p.h. (km.)	71	*115*	81	*130*	75	*120*	68	*110*	81	*130*	130	*210*
min.	m.p.h. (km.)	40	*65*	37	*60*	43	*70*	34	*55*	43	*70*	...	
asc.	f.p.m. (m.)	657	*200*	1080	*330*	460	*140*	820	*250*	525	*160*	...	

Notes.—Wood and steel construction. *Control:* warping wings, elevator in rear; single rudder. 2 wheels only for landing. The 1913 and 1914 types differ especially in the suppression of skids in the 1914 models, which are consequently considerably lighter.



Scout Monoplane.

P—*continued.*

PONNIER.—*continued.*

1914. 1-seater 1 iplane.

R

R.E.P.

Cabinet a' Etudes en recherches techniques. Robert Esnault-Pelterie, 37, Rue des Abondances. Boulogne sur Seine (Seine). *School*: Buc. One of the earliest established French firms. The first to go in for steel construction. Output capacity: 50 machines a year.

1914 Model **Steel monoplanes.**		1-seater.		2-seater.	
Length	feet (m.)	22¼	6·74	25¾	7·67
Span	feet (m.)	33¾	10·25	37	11·25
Area	sq. feet (m²)	205	19	257	23
Weight ...	machine, lbs. (kgs.)	580	263	650	295
	useful ... lbs. (kgs.)	331	150	550	250
Motor	h.p.	60 Le Rhone		80 Gnome	
Speed ...	max. m.p.h. (km.)	75	120	78	125
	min. m.p.h. (km.)	56	90	54	87
	asc. f.p.m. (m.)	493	150	352	107

Remarks.—Steel construction. Pentagonal and triangular body. Lateral control: warping. Landing gear: two wheels (oleo-pneumatic suspension).

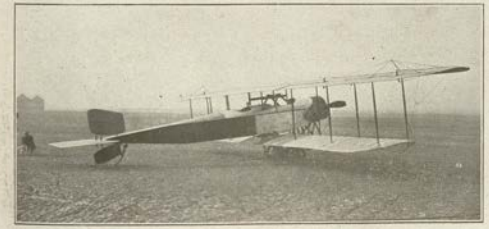
Monoplane.

S

SCHMITT. Aeroplanes. Paul Schmitt, Boite postale No. 5, Chartres. *School*: Aerodrome de Chartres. Output capacity: 50 machines a year.

1914 type.		Model 7. 3-seater biplane.		Model 8. 2-seater biplane.	
Length	... ... feet (m.)	32½	*10·00*	23	*7·00*
Span	... ... feet (m.)	57½	*17·50*	35	*13·50*
Area	... ... sq. feet (m².)	527	*49*	215	*35*
Weight	total ...lbs. (kgs.)	1435	*650*		
	useful ...lbs. (kgs.)	992	*450*	...	
Motor	... ... h.p.	160 Gnome		80 Gnome	
Speed	max. m.p.h. (km.)	72	*116*	...	
	min. m.p.h. (km.)	40	*55*	...	
	asc. f.p.m. (m.)	410	*125*	...	

Notes.—Fitted with a special varying angle device. *Control*: ailerons and rear elevator. Steel construction. Enclosed body. Landing gear: two reinforced skids and two wheels on the same axle.

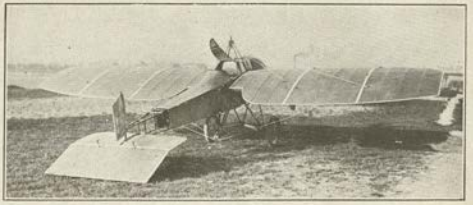


V

VENDOME. Raoul Vendome & Co., 30 *bis*, Rue Cauchy, Paris (XV). *School*: Issy-les-Moulineaux (Seine). One of the oldest French firms. Output capacity: 50 machines a year.

1914 type.		Single-seater monoplane.	
Length	... ... feet (m.)	19	*5·85*
Span	... ... feet (m.)	28½	*8·75*
Area	... ... sq. feet (m².)	172	*16*
Weight	machine, lbs. (kgs.)	485	*220*
	useful ...lbs. (kgs.)	385	*175*
Motor	... ... h.p.	60 Gnome and Le Rhone	
Speed	max. m.p.h. (km.)	65	*125*
	min. m.p.h. (km.)	53	*85*
	asc. f.p.m. (m.)	492	*150*

Remarks, Notes and Details.—Wood construction. Rectangular body. Lateral control: warping. Landing gear: two large wheels. Demountable in 40 seconds.



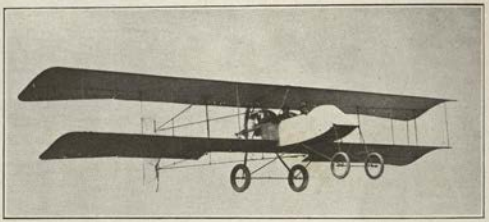
V—*continued.*

VOISIN. Voisin Aéroplanes, Boulevard Gambetta, Issy le Molineux, (Seine). *School*: Mourmelon-le-Grand (Marne). The oldest aeroplane firm in the world, founded by the Brothers Voisin in 1905. (See past editions). Output capacity: 90 machines a year.

Latest models are:

1914 models.		2-seater.		Armoured 2-seater.	
Length	feet (m.)	31	9·50	31	9·50
Span	feet (m.)	44½	13·50	44½	13·50
Area	sq. feet (m²)	452	42	452	42
Weight ...	total ...lbs. (kgs.)	1320	600	1540	700
	useful ...lbs. (kgs.)	617	280	992	450
Motor	h.p.	80 Gnome / Le Rhône / Clerget		130 Canton-Unne	
Speed ...	max. m.p.h. (km.)	59	95	68	110
	min. m.p.h. (km.)	28	45	31	50
	asc. f.p.m. (m.)	557	170	657	200

Notes.—Steel construction. *Control*: ailerons and rear elevator. Landing gear: four wheels. These are generally regarded as the best French military machines.



2-seater.

3-seater.

FRENCH DIRIGIBLES.

Military.

Date.	Name.	Make.	Type.	Capacity in m³.	H.P.	Speed. m.p.h. (K)	Notes.
1909	**COL. RÉNARD**	Astra	n.r.	4200	100	29 (46)	
1910	**LIBERTE**	Lebaudy	s.r.	4800	120	31 (50)	
1911	**ADJUTANT REAU**	Astra 10	n.r.	8950	220	32 (53)	
,,	**LIEUT. CHAURE**	Astra 11	n.r.	8850	220	32 (53)	
,,	**CAPT. MARÉCHAL**	Lebaudy	s.r.	7500	160	28 (45)	
,,	**LE TEMPS**	Zodiac 9	n.r.	2200	50	29 (48)	
,,	**CAPT. FERBER**	Zodiac 10	n.r.	6000	180	33 (54)	
1912	**ÉCLAIREUR CONTÉ**	Astra	n.r.	9100	400	28 (44)	
,,	**ADJUTANT VINCENNOT** ...	C. Bayard	n.r.	9000	260	35 (56)	
,,	**DEPUY DE LOME**	C. Bayard	n.r	9000	270	35 (56)	
,,	**SELLE DE BEAUCHAMP** ...	Lebaudy	s.r.	8000	160	28 (45)	
1913	**E. MONTGOLFIER**	C. Bayard	n.r.	6500	150	36 (58)	
,,	**COMOT COUTELLE**	Zodiac	n.r.	9500	360	37 (60)	
,,	**SPIESS**	Zodiac	rig.	16400	400	43½ (70)	
,,	**FLEURUS**	Mil. Wks.	n.r.	6500	160	40 (65)	
1914	**ASTRA-TORRES XV.**	Astra	n.r.	23000	800	43 (70)	*All Building*
,,	**ASTRA-TORRES XVI.**	Astra	n.r.	23000	800	43 (70)	
,,	**CLEMENT-BAYARD VIII.** ...	C. Bayard	n.r.	23000	1000	47 (75)	one gun
,,	**CLEMENT-BAYARD IX.** ...	C. Bayard	n.r.	23000	1000	47 (75)	one gun
,,	**ZODIAC XII**	Zodiac		23000	1000	50 (80)	
,,	**ZODIAC XIII**	Zodiac		23000	1000	50 (80)	

Military sheds at Belfort, Epinal, Maubeuge, Reims, Toul, Verdun (2).—Total 7.

Army Dirigible Pilots.

Airanlt, F.
Balny D'Avricourt
Baudry, A.
Bayard de Mendoza
Clerget, P.
Cohen, A.
Herbster, M.
Hirschauer, Col.
Juchmès, G.
Mugnier, Capt.
Noe, Martial
Périssé, Y.
Renard, Col. P.
Roussel, A.
Sebelcher, A.

Note.—There are no dirigibles attached to the Navy.

Private.

Date.	Name.	Make.	Type.	Capacity in m³	H.P.	Speed. m.p.h. (k.p.h.)	Remarks.
1909	**TRANSAERIEN I**	Astra	n.r.	4475	100	27 (43)	
1909	**ZODIAC III**	Zodiac 3	n.r.	1400	40	28 (45)	
1911	**ASTRA TORRES I**	Astra	n.r.	1930	55	34 (56)	
1912	**TRANSAERIEN II**	Astra 13	n.r.	9000	350	34 (56)	

Private sheds at Chalons-s-Marne, Issy (2), Lamotte-Breuil, Meaux, Melun, Mousson, Reims, Pau, St. Cyr (2).—Total 11.

Private Dirigible Pilots.

Capazza, Louis
Godart, Louis
Juchmes
Jalliott, Henri
Kapferer, Henri
La Vaulx (de) Compte
Santo-Dumont, Albert
Surcouf, E

ASTRA CLASS.

Astra Societe de Constructions Aeronautique, 13, Rue Couchot, and 121, Rue de Bellevue, Billancourt, also "Airships Ltd.," 47, Victoria Street, London, W.

This Society was founded by Surcouf for the production of ordinary balloons. The first dirigible work was building part of the old *Lebaudy* in 1903, followed in 1906 by the *Ville de Paris*. The total number of dirigibles of this type completed by the end of 1913 stood at 16.

Owing to changes in names, or owing to two names getting supplied to one ship, confusion frequently exists as to the names of the Astra dirigibles. The correct list is as follows:—

1.	***Part of the LEBAUDY***	1903
2.	***VILLE DE PARIS***	1906
3.	***VILLE DE NANCY***	1909
4.	***Russian Military dirigible, KOMMISSIONNY,*** originally known as ***CLEMENT-BAYARD I*** ...	1909
5.	***COLONEL RENARD***	1909
6.	***ASTRA-TRANSAERIENNE-VILLE DE PAU-VILLE DE LUCERNE***	1909
7.	***ESPANA (Spanish Military)***	1909
8.	***VILLE DE BRUXELLES***	1910
9.	***ASTRA TORRES I***	1911
10.	***LIEUT. CHAURE (French Military)***	1911
11.	***ADJUTANT RÉAU (French Military)***	1911
12.	***ECLAIREUR CONTE (French Military)***	1912
13.	***Russian Military.***	1912
14.	***ASTRA-TORRES XIV (British Navy)***	1913
15.	,, ,, ***XV***	
16.	,, ,, ***XVI***	

*This ship has frequently figured as four different dirigibles.

The general features of the *Astra* class are: Non-rigid, weights distributed by means of a long girder hung under the gas bags, a long nacelle, and inflated stabilising shapes at the rear end of the balloon.

The *Astra-Torres* type are also non-rigid, but trefoil section with 1 or 2 short nacelles.

The Astra firm has dirigible hangers at Issy, Pau, Meaux, and Reims. Its constructional capacity is sufficient to build six dirigibles at any one time.

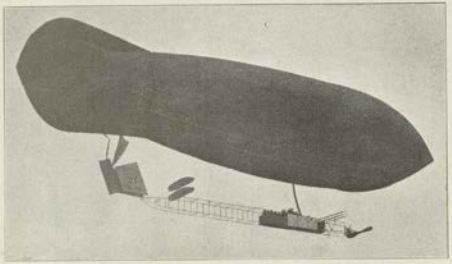
ASTRA.—*(continued.)*

Name ... ... **Astra** No. ... ... Date ... ... Service	**ASTRA, I TRANS-AERIEN.** v de Pau, v de Lucerne **1909. Private.**	**COL. RENARD. 10. 1909. Military.**	**LIEUT. CHAURE. 10. 1911. Military.**	**ADJT. REAU. 11. 1911. Military.**	**ECLAIREUR CONTÉ. 12. 1912. Military.**
Volume ... c. feet	158,000	145,000	312,550	314,000	320,000
(m³.)	**4,475**	**4.200**	**8,850**	**8,950**	**9,100**
Length ... feet (m.)	197 *60*	213 *65*	275 *83·80*	295 *90*	271 *82·50*
Diameter ... feet (m.)	40 *12·20*	35 *11·10*	46 *14*	46 *14*	46 *14*
Empennage, etc. feet (m.)	One ballonet	Ballonet	Ballonet	Cellular, automatic stab.	Cellular, automatic stab.
Nacelles	One	One	One	One	One 115×5½×6 ft. (35×1·60×1·80)
Lift ... total, tons (kg.)	7 *7150*	4½ *4500*	8¾ *8750*	9 *9000*	..
useful, tons (kg.)	.. ..	.. ..	.. ..	.. ..	..
Motors ... ... h.p.	One 110 C. Bayard	One 120 Panhard	Two 120 Panhard (=240 h.p.)	Two 120 Brasier (=240 h.p.)	Two 200 Chenu (=400 h.p.)
Propellers ... number ...	One tractor	One Chauviere tractor	One tractor	1 tractor, 2 propellers	4 central, 650 r.p.m.
blades ..	Two	..	..	..	Two
diam. feet (m.)	16½ *5*	..	..	19½ & 12 *6 & 3·70*	13 *3.80*
Max. Speed ... m.p.h. (km.)	27 *43*	29 *47*	32 *53*	32 *53*	28 *44*
Full Speed Endurance hrs.	.. ..	.. ..	*about* 10 hours	*about* 12 hours	*about* 12 hours
Complement	.. ..	.. ..	.. ..	.. ..	..
Station	.. ..	.. ..	.. ..	.. ..	..
Notes—					Generally considered the most successful of the French dirigibles. Usual type of Astra stern given up. Petol carried ; 360 litres.

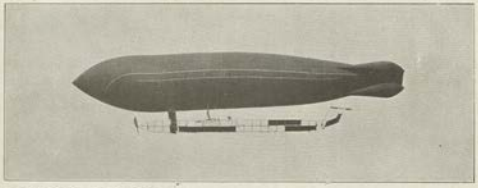
ASTRA-TORRES.

Name ... ... **Astra** No. ... ... Date ... ... Service	**ASTRA-TORRES I. 9. 1911. Experimental.**	**ASTRA-TORRES XV. 15. 1914. Military.**	**ASTRA-TORRES XVI. 16. 1914. Military.**
Volume ... c. feet	68,150	810,000	810,000
(m³.)	**1,930**	**23,000**	**23,000**
Length ... feet (m.)	157 *47.72*	457 *139*	457 *139*
Diameter ... feet (m.)	33 *10*	56 *16*	56 *16*
Empennage, etc. feet (m.)	2 Ballonets	..	..
Nacelles	One 18×5×6½ ft. (5·50×1·50×2)	Two, each 43×7½×7 (13·15×2·30×2·15)	Two, each 43×7½×7 (13·15×2·30×2·15
Lift ... total, tons (kg.)	..	..	..
useful, tons (kg.)	..	..	..
Motors ... ... h.p.	One 55 Chenu Ruban Clutch (=55 h.p.)	4 Chenu 200 Hele Shaw clutch (=800 h.p.)	4 Chenu 200 Hele Shaw clutch (=800 h.p.)
Propellers ... number ...	1 in rear	4 Integral	4 Integral
blades ..	Two	..	..
diam. feet (m.)	14¾ *4.50*	12½ *3·80*	12½ *3.80*
Max. Speed ... m.p.h. (km.)	31 *50*	43 *70*	43 *70*
Full Speed Endurance hrs.	*about* 5 hours	*about* 24 hours	*about* 24 hours
Complement	..	..	..
Station	..	..	..
Notes—	Constructed in 3 lobes ; one above, two below. This is the special feature of all *Astra-Torres* ships.		

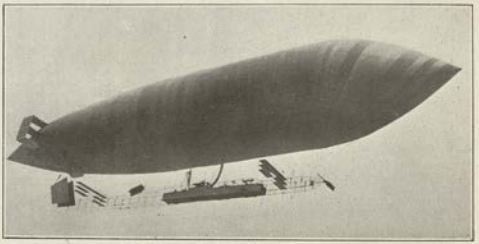
ASTRA – *Continued.*



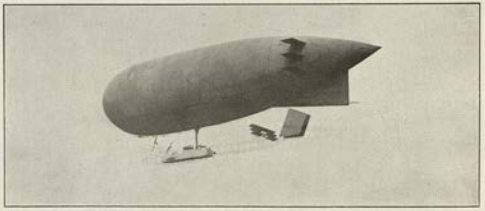
TRANSAERIEN I, etc. (1909). Volume: 4475 m³.



COLONEL RENARD. (1909). Volume: 4200 m³.
LIEUT. CHAURE. (1911). Volume: 8850 m³.

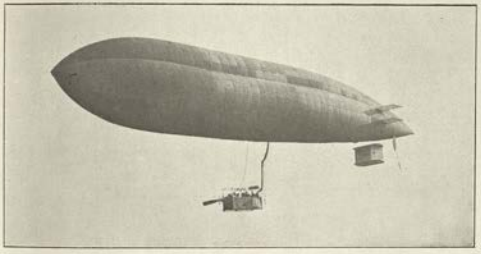


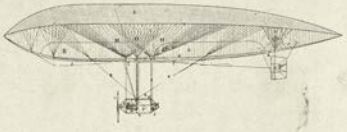
ADJUTANT REAU. (1911). Volume: 8950 m³.



ECLAIREUR CONTÉ. (1912). Volume: 9100 m³.

See next page.





ASTRA-TORRÈS I. (1911). "*Vedette*" Volume : 1930 m³.

CLEMENT-BAYARD CLASS.

Usines Clement-Bayard, 33, quai Michelet, Levallois-Perret (Seine).

These dirigibles, until No. 4, closely resemble the *Astra* class in some main particulars, but (excepting *I*) differ from them in the sharp sterns and absence of stabilisers on stern; Recent types have one short nacelle and rear empennage like *Astra* class.

The ships built of this class are:—

1	**CLEMENT-BAYARD I**	(*Kommissionny*) ...	...	**Russian Military** (1909)
2	,, **II**	...	...	**British Military** (wrecked) (1911)
3	**DUPUY DE LOME**	... ...	...	**French Military** (1912)
4	**ADJUTANT VINCENNOT**	... ...	...	**French Military** (1912)
5	**CLEMENT-BAYARD V**	... ...	...	**Russian Military** (1913)
6	**E. MONTGOLFIER VI**	... ...	...	**French Military** (1913)
7	**CLEMENT-BAYARD VII**	... ...	...	
8	*Building* **VIII**	... ...	...	**French Military** (1914
9	*Building* **IX**	... ...	...	(1914)

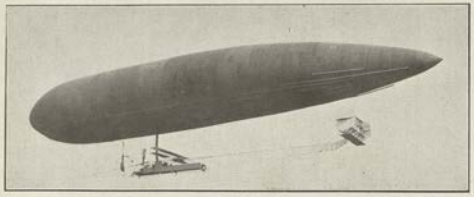
CLEMENT-BAYARD.—(*continued*).

Name... ... ... **Clement-Bayard** No. Date ... ... Service	**DUPUY DE LOME.** **3.** **1912.** **Military.**	**ADJT. VINCENNOT.** **4.** **1912.** **Military.**	**E. MONTGOLFIER.** **6.** **1913.** **Military.**	**C.B. VIII.** **8.** *Building.* **Military.**	**C.B. IX.** **9.** *Building.* **Military.**
Volume ... c. feet	318,000	318,000	229,000	810,000	810,000
... (m^3.)	**9,000**	**9,000**	**6,500**	**23,000**	**23,000**
Length ... feet (m.)	290 *88*	290 *88*	242 *73·50*	525 *160*	525 *160*
Diameter ... feet (m.)	44½ *13·50*	44½ *13·50*	40 *12·20*	52½ *16*	52½ *16*
Envelope	Continental	Continental	..	..	..
Nacelles	One	One	One	One 66 ft. (*20 m.*) long	One 66 ft. (*20 m.*) long
Lift ... total, tons (kg.)	8 *8000*	8 *8000*	.. ..	..	..
... useful, tons (kg.)	3½ *3500*	3½ *3500*	2¾ *2800*	11 *11000*	11 *11000*
Motors ... ... h.p.	2—130 C. Bayard (=260 h.p.)	2—130 C. Bayard (=260 h.p.)	2—75 C. Bayard (=150 h.p.)	4—250 C. Bayard (=1000 h.p.)	4—250 C. Bayard (=1000 h.p.)
Propellers ... number ...	2 Chauviere	2 Chauviere	2 Chauviere	..	..
... blades ...	..	..	..	..	..
... diam. feet (m.)	19¾ *6*	19¾ *6*	13½ *4·20* (Also 1 ascensional diam. 4 ft.)	..	..
Max. speed ... m.p.h. (km.)	35 *56*	35 *56*	36 *58*	47 *75*	47 *75*
Full speed endurance hrs.	12 ..	12 ..	.. ..	24 ..	24 ..
Complement	..	..	..	..	..
Station	..	..	..	..	..

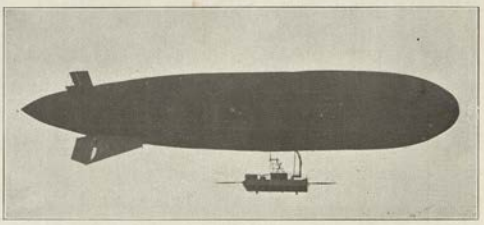
Gun on top of envelope in *VIII* and *IX*.

Remarks.—The feature of this *C.B.* type, which distinguishes it from the *Astra* ships of about the same size, is the arrangement of the propellers and the use of a 2 speed gear in connection with these. Normally each motor drives its own propeller through two sets of gearing connected by a Cardan shaft. On stopping one motor, the stopped motor is uncoupled from its propeller shaft, which is then connected up by chain drive to the opposite shaft. The running motor is then put on to a "low gear," so that it can make the revolutions necessary for obtaining full power, while the propellers run slower than before. The ratio of "low gear" to "high" is 2 to 1, so that a single motor will be running under its best conditions when well throttled down.

109548



ADJUTANT VINCENNOT (1912). Volume : 9000 m³.
also ***DUPUY DE LOME*** (1912). Volume : 9000 m³.



E. MONTGOLFIER (1913). Volume : 6500 m³.

LEBAUDY CLASS.

Ateliers Lebaudy Frères, Moisson, par La Roche-Guyon (Seine-et-Oise).

DISTINCTIVE CHARACTERISTICS:

The cars are short and suspended from a long keel which is suspended close up to the gas bag, and is mostly covered in with fireptoof canvas.

The rear end of the keel is expanded into fixed vertical and horizontal fins, and carries a vertical and a horizontal rudder.

The rear end of the gas bag is fitted with thin fixed planes (compare with the pear shaped or tubular fins of the "Astra" class).

The cars are provided underneath with an extraordinarily strong conical structure, which takes the shock of striking the ground and distributes it over the whole car.

Aeroplanes are now fitted, one each side of the keel, well forward.

Ships of this class which have been built:—

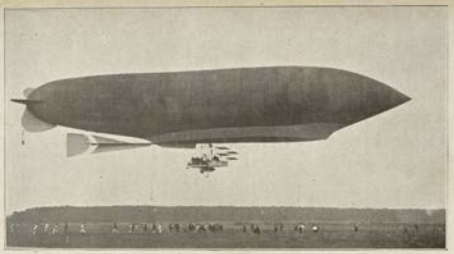
	LEBAUDY I	***French Military Airship.***	Rebuilt 1909 into *Lebaudy II.*
1.	***LEBAUDY II***	,, ,,	Original *Lebaudy I* rebuilt. Known as *Le Jaune.* } now discarded
2.	***PATRIE***		Lost in a storm.
3.	***REPUBLIQUE***	***French Military Airship.***	Wrecked Autumn, 1909.
4.	***LA RUSSIE***	***Sold to Russian Government.***	Now *Lebed.*
5.	***LIBERTÉ***	***French Military Airship.***	
6.	***CAPITAINE MARCHALL***	,, ,,	
7.	***"MORNING POST"***	***British Military.***	(*Lebaudy III.*) Wrecked 1911
8.	***LIEUT. SELLE DE BEAUCHAMP.***	***French Military Airship.***	

To Lebaudy designs:—

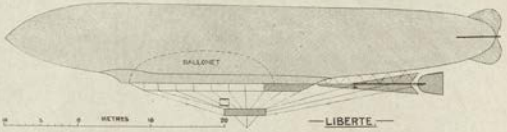
ONE ... ... ***Austrian Military Airship.***

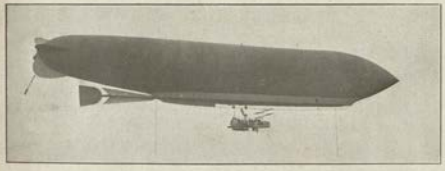
LEBAUDY.—(*continued*).

Name ... ... / Date ... ... / Service	LIBERTÉ 1910. Military.	CAPITAINE MARCHALL. 1911. Military.	SELLE DE BEAUCHAMP. 1912. Military.
Volume ... ... c. feet (m³.)	4800	7500	8000
Length ... ... feet (m.)	220 67	279 85	292 89
Diameter ... ... feet (m.)	35½ 10·80	42 12·80	48 14·60
Gas bags ... fabric	Lebaudy	Lebaudy	Lebaudy
Gas bags ... ballonets	1	...	...
Lift ... ... total ...tons	4½		9
Lift ... ... useful, tons	...	...	...
Motors ... ... h.p.	1—135 Panhard	2—80 Panhard	2—80 Panhard
Propellers number	2 wood	2 wood	2 wood
Propellers blades	2	2	2
Propellers diam. ... feet (m.	...	16½ 5	16½ 5
Speed ... max. m.p.h. (km.)	31 50	28 45	28 45
Endurance ... ... hrs.	...	...	...
Complement	...	...	5

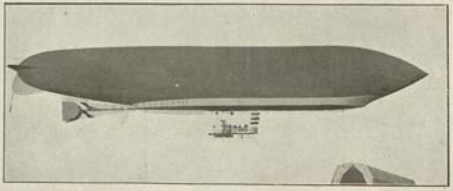


LIBERTÉ





CAPITAINE MARCHALL.



SELLE DE BEAUCHAMP.

ZODIAC CLASS.

Société française de ballons dirigeables et d'aviation, Zodiac, 10 route du Havre, Puteaux (Seine).

These dirigibles were intended primarily for private pleasure purposes. Consequently they are designed to fly when filled with coal gas if necessary.

Every effort is made to render them easily transportable; the long girder frame by which the weight is distributed is made to take to pieces.

It is held in France that numbers of this class of vessel would form an invaluable asset in time of war, as each could be transported in a single cart, filled with a very few bottles of hydrogen, and when so filled could manœuvre for some 6 hours at a speed which compares favourably with that of the standard types.

When the service of reconnaissance was performed, the vessel could be packed up and sent out of harm's way in an hour, whereas this could scarcely be done with a larger vessel on account of the quantity of hydrogen that would be required if it had to be filled afresh for each service. The mooring of an airship in the open during war requires such an amount of preparation and attention as to be a serious drawback to the alternative plan of keeping such vessels unfilled, while the sending of an airship back to its distant shed on each occasion means doubling the work that the ship is called upon to perform.

Ships built of class are:—

1. **ZODIAC I** (*Petit Journal*) (*gone*)
2. ,, **II** (*De la Vaulx*) (*gone*)
3. ,, **III** ...
4. ,, **IV** ... **Dutch Military**
5. ,, **V** ... **South American (private)**
6. ,, **VI** ... **Sold to United States**
7. ,, **VII** ... **Sold to Russian Army**
8. **ZODIAC VIII** ... **Sold to Russian Army**
9. ,, **IX** (*Le Temps*) **French Army**
10. ,, **X** (*Capitaine Ferber*) ,,
11. ,, **XI** (*Commandant Coutelle* ,,
12. ,, **XII** ,,
13. ,, **XIII** ,,

Also the *Spiers* (rigid)

ZODIAC.—*continued.*

Name... ... . Zodiac No. ... Date ... . Service ...	ZODIAC III. 3. 1909. Private.	LE TEMPS. 9. 1911. Military.	CAPT. FERBER. 10. 1911. Military.	COMMPT. COUTELLE. 11. 1913. Military.	12. *Building.*	13. *Building.*
Volume ... ... c. feet	49,300	81,250	211,000	334,500	810,000	810,000
(m³.)	**14,000**	**2,300**	**6,000**	**9,500**	**23,000**	**23,000**
Length ... ... feet (m.)	134 *40·80*	164 *50·25*	249½ *76*	302 *92*	428 *130*	428 *130*
Diameter ... feet (m.)	28 *8·50*	29½ *9*	40½ *12·56*	46 *14*	..	..
Envelope, etc.	Continental, one ballonet	Two ballonets	Two ballonets, 650 m³. each	Two ballonets, 1300 m³. each	..	..
Nacelle...	One 130 ft. (*40*) long	One	One 115 × 4½ × 6½ ft. (*35 × 1·50 × 2* m.)	One —131½ × 4½ × 7 (*40 × 1·50 × 2*)	Two	Two
Lift ... total, tons (kg.)	1½ *1,540*	..	6 *6,000*	9½ *9,500*	..	..
useful, tons (kg.)	..	..	..	..	..	..
Motors ... ... h.p.	1—45 Ballot	1—60 Dansette Gillet	2—90 Dansette Gillet (=180 h.p.)	2—190 h.p. (=380 h.p.)	4—250 Chence (=1000 h.p.)	4—250 Dansette Gillet (=1000 h.p.)
Propellers ... number ...	1 Chauviere in rear	2 either side amidships	2	4	..	..
blades ...	2	2	4	..	..	..
diam. feet (m.)	12½ *3·75*	..	..	15 *4·50*	..	..
Max. speed ... m.p.h. (km.)	28 *45*	..	35 *55*	37 *60*	50 *80*	50 *80*
Full speed endurance hrs.	..	..	15	15	24	24
Complement	..	..	..	6	..	..
Station...	..	..	..	..	..	..

ZODIAC III.

Maximum length, 134 feet (40·8 m.) **maximum diameter,** 28 feet (8·5 m.) **volume,** 1,400 m³.

Total lift.—1½ tons (1,540 kgs.) **Useful lift,** lbs. (kgs.)

Gas bags.—Light continental rubbered fabric.

Motor.—Ballot, 4-cylinder, 40-45 h.p., 1,200 r.p.m.

Speed.— m.p.h. (45 km.p.h.)

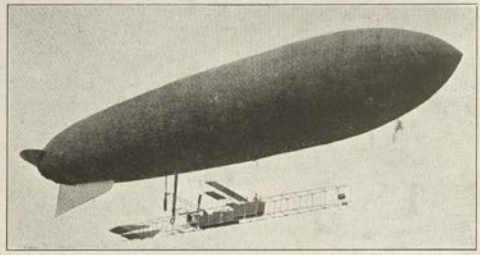
Propellers.—Driven at 600 r.p.m. Integral type, 12¼ feet (3·75 m.) in diameter. Pitch, 6½ feet (2 m.) in rear of the car.

Steering.—Vertical balanced rudder in rear of the vertical fin, under the rear of the gas bag. Double elevator above the fore end of the car. Horizontal fins of material spread on iron frames on either side of the rear end of the car.

Remarks.—The car consists of a 130 feet (40 m.) long wooden girder, which can be divided into 4 separate parts of 13 feet (4 m.) each. The suspension is by steel wires fitted with adjusting screws at the lower ends and toggles at the upper ends, by which they connect to the crows' feet which are sewn to the suspension strips.

LE TEMPS. Military.

(Alias **ZODIAC IX.***)*



Maximum length, 164 feet (50·25 m.) **maximum diameter,** 29½ feet (9 m.) **volume,** 81,250 cubic feet (2,300 m³.)

Total lift.—

Gas bag, etc.—2 ballonets, each of 257 m³.

Motor.—Dansette-Gillet. 60 h.p.

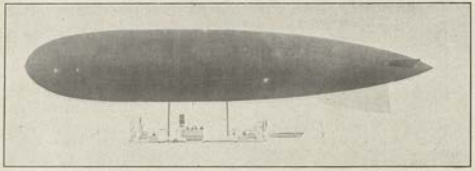
Propellers.—2, chain driven, one on either side of car.

Speed.—

Steering.—Elevator in *nacelle* amidships.
Rudder aft.

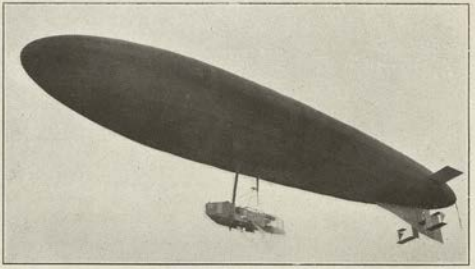
Remarks.—

CAPITAINE FERBER.



COMMANDANT COUTELLE. Military. (1913).

(ZODIAC XI.)



Maximum length, 302 feet / 92 m. **maximum diameter,** 46 feet / 14 m. **volume,** 334,500 c.feet / 9,000 m³.

Gas bags, etc.—2 ballonnets, each 45,900 c. feet (1,300 m³.)

Nacelle.—Nickel steel in 5 sections. Length, 131½ (40 m.) Width, 4½ feet (1·50 m.) Hung 16½ feet (5 m.) below the balloon. Pilot in centre. Carries a total crew of six, petrol and oil for 15 hours' continuous work at full power.

Motors.—2, each of 190 h.p.=total of 380 h.p. Placed one at either end of the nacelle.

Propellers.—4, of 15 feet (4·50 m.) diameter. Two geared to each motor to half engine speed.

Speed—37 m.p.h. (60 k.p.h.)

ZODIAC XII. *(Building.)*
ZODIAC XIII. *(Building.)*

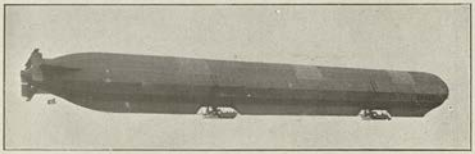
Building.

	Z XII & Z XIII.
Length ... ... feet (m.)	428 *130*
Diameter ... ... feet (m.)	...
Volume ... ... c. feet (m³.)	810,000 *23,000*
Nacelles	two
Motors	4—each of 250 h.p. (=1000)
Speed ... m.p.h. (k.p.h.)	50 *80*

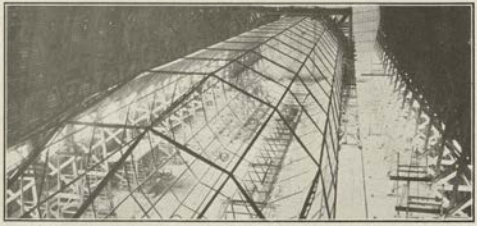
FLEURUS. Military. (1913). Constructed at the Military Works, Chalais, Meudon.

Length ... ... feet (m.)	254 *77*
Diameter ... ... feet (m.)	40 *12·40*
Volume ... c. feet (m³.)	229,000 *6500*
Nacelles	one short
Empennage	Cellular
Motor	2 of 80 h.p. (=160)
Speed ... m.p.h. (*k.p.h.*)	40 *65*

SPIESS. Military. (1913). Established by the Zodiac Co. Wood Construction.



As reconstructed, 1914.



Details as enlarged. *Photo, Branger.*

Maximum length, 450 feet (140 m.) **maximum diameter**, 42½ feet (13 m.) **volume**, 578,000 c.f. (16,400 m³.)

Gas bags.—Sections 15. Number of cylindrical sections 8. Number of sides to polygon 14.

Motors.—Two 6-cylinder 200 h.p. in each nacelle, each driving 2 propellers of 15 feet (4·50 m.) diameter.

Speed—43½ m.p.h. (70 k.p.h.)

GERMAN.

(By our special German editor.)

These details were all received a few days before the Austrian ultimatum to Servia, which led to the present world-war: and the accuracy of all is guaranteed as delivered at a time when the present situation was unthinkable.—F. T. J.

Aerial Journals:—

Deutsche Luftfahrer Zeitschrift Berlin, W. (Fortnightly)
Automobil Welt, Berlin (Thrice Weekly).
Das Deutsche Auto, Munich (Weekly).
Der Kraftfahrer, Der Pilot, Berlin (Weekly)
Die Luftflotte, Berlin (Monthly).
Luftverkehr, Düsseldorf (Fortnightly).
Internationale Revue für Autowesen & Aviatik, Leipzig (Fortnightly).
Flugsport, Frankfurt (Fortnightly).
Motor, Berlin (Monthly).
Der Motorwagen, Berlin (Thrice Monthly).
Monatshefte der Reichsfliegerstiftung, Charlottenburg (Monthly).
Zeitschrift für Flugtechnik & Motorluftschiffahrt, Berlin (Fortnightly).

Private Flying Grounds :—

Berlin-Johannisthal, (29 firms). The principal are: *Albatros, Luftverkehrs-Gesellschaft, Luftfahrzeug-Gesellschaft, Joonin, Rumpler, Ago, Brandenburgische Flugzeug Werke.*
Berlin-Schulzendorf. Berliner Flugsport Verein.
Berlin-Teltow. Union Pfeilflug-Gesellschaft.
Bork i. d. Mark. (*Mars, Grade, Charlett*).
Burg. (*Schulze*).
Cassel-Waldau. (*Abelmann*).
Chemnitz. Chemnitzer V. f. L.
Coswig. (*C. Wanke*).
Dessau. (*C. Wanke*).
Dresden. (*C. Wanke*).
Düsseldorf. Düsseldorfer Luftfahrer Club.
Erfurt. Militärübungsplatz "Drosselberg," Schwade.
Frankfurt a/M.-Niederrad. (*August Euler*).
Frankfurt a. M.-Rebstock. Frankfurter Verein f. L. F., Deutsche Sommer Flugzeug Werke.
Friedrichshafen. Flugzeughau Friedrichshafen G.m.b.H.
Gelsenkirchen-Essen-Rotthausen. (*Kondor*).
Görrix. (*Fokker* seaplanes).
Gotha. (*Gothaer Waggonfabrik A.-G.*)
Halberstadt. (*Bristol*).
Hamburg-Fuhlsbüttel.
Kiel. Nordmarkverein für Motorluftschiffahrt, Steffen.
Konstanz. Verein für Luftschiffahrt am Bodensee.
Leipzig-Mockau. Deutsche Flugzeug-Werke, Erich Schmidt.
Mainz-Grosser Sand. (*Goedecker*).
Mülhausen i Els.-Habsheim. Automobil- & Aviatik-Ges.
München-Neufreimann. (*Otto*).
München-Puchheim. Akademie für Aviatik.
Nieder-Neuendorf. (*A.E.G.*)
Schwerin i/M.-Görries. (*Fokker*).
Wanne i.W. Rheinisch-Westfälische Flug- & Sportplatz G.m.b.H. (*Albers*).
Warnemünde. Bat der Seestadt Rostock.

GERMAN AERIAL CLUBS.

Aerial Societies:—

Aachener V. f. L. Aix la Chapelle.
Aero Club (Imperial), 3, Nollendorfplatz, Berlin. Sec.: H. Von Frankenberg und Ludwigsdorf.
Akademie für Aviatik, Munich.
Allgemeiner Deutscher Automobil Club, Munich.
Anhaltischer V. f. L. (E. V.) M. Antoinettten str. 22a, Dessau.
Augsburger Verein für Luftschiffahrt, Augsburg.
Automobil-und Flugtechnische-Gesellschaft (E. V.) Nurnberger Platz 5, Hauptverein Berlin, Hochster Str. 1, Bezirksverein Frankfurt a. M, Neuer Wall 44, II, Hamburg.
Bayerischer A. K. Munich.
Berliner V. f. L., Berlin.
Bilterfeldt V. f. L., Bilterfeld.
Braunschweigische V. f. L.
Breisgau V. f. L., Freiburg.
Bremer V. f. L. (E. V.) N. W., Obersntr. 32/34 I, Bremen.
Bromberger V. f. L. (E. V.) O, Gasanstalt, Bromberg, Stadt.
Chemnitzner V. f. L.
Deutsche Touring Club, Munich.
Deutscher Luftflotten Verein, Mannheim.
Dusseldorfer Luftfahrer-Klub (E. V.) W. Dusseldorf, Breite Str. 25, I.
Erfurter V. f. L. (E. V.) M. Dalversweg 24, Erfurt.
Flugverein Neustadt a. d. Haardt, S.W., Neustadt, I.
Flugzeugkonvention des V. D. M. L., Potsdamer Str. 121 H, III, Berlin W.
Frankfurter Flugsport-Club (E. V.) Neue Mainzer Str. 56, Frankfurt a. M.
Frankfurter Flugtechn, Verein (E. V.) Bahnhofplatz 8, Frankfurt a. M.
Frankfurter V. f. L. (E. V.) S. W. Kettenhofweg 136, Frankfurt, a. M.
Frankischer V. f. L. (E. V.) S. Kurschenhof 6, Wurzburg.
Hamburger V. f. L. (E. V.) N. W., 36, Colonnaden 17-19, Hamburg.
Hannoverscher V. f. L. (E. V.) N. W., Lortzingstr. 6, Hannover.
Herefordер Verein fur Luftfahrt, Bahnhofplatz, Allersmann, Herford.
Hildesheimer V. f. L., Hildesheim, Lucienvorder str. 22.
Kaiserlicher Aero-Club, K. Nollendorfplatz 3, Berlin W.
Kaiserlicher Automobil-Club, K. 9 Leipzigerplatz 16, Berlin W.
Karlsruher Luftfahrt-Verein (E. V.) S. W., Bachstr, 28, Karlsruhe.
Kolner Club, f. L. (E. V.) W. Bischofsgartenstr. 22, Koln.
Koniglich Bayerischer Automobil-Club, B. Brienner str. 5 I, Munchen.
Koniglicher Sachsischer V. f. L. (E. V.) Sa, Eerdinandstr. I, Dresden.
Kurbesischer V. f. L. (E. V.) S. W., Physikalisches Institut, Marburg ad Lahn; Cassel Sektion, Kolnische str. 84, Cassel.
Leipziger V. f. L., (E. V.) Sa. Markt 1, Leipzig.
Lubecker V. f. L. (E. V.) N. W., Israeldorfer Allee 13a, Lubeck.
Luftahrtverein Gotha (fruther Reichsflugverein Gotha), Gotha, I.
Luftfahrtverein Touring-Club, Prunner str. 24, I, Munchen.
Luftschiffahrt-Verein Munster fur Munster und das Munsterland (E. V.) N. W., Munster i. W, Klosterstr. 31-32.
Magdeburger V. f. L. (E. V.) M, Wetterwarte, Bahnhofstr. 17, Magdeburg.
Mannheimer V. f. L. "Zahringen" (E. V.) S. W. 7-8 Hansa-Haus, Mannheim.
Mecklenburgerischer Aero-Club, Kaiser-Wilhelm-Str. 85, II, I, Schwerin i. M.
Mindener Verein fur Luftfahrt, N.W., Grosser Domhof 1, I., Minden i. W.
Mitterheinischer V. f. L., S. W., Weisenauer, Str. 15, Mainz.
Munchener V. f. L. (E. V.) Residentstr. 27 III, Munchen.
Niederrheinischer V. f. L. (E. V.) Wilhemstr. 11, Bonn, Wupperthal Sektion, Hauptfeuerwache, Barmen; Essen Sektion, Bachstr. 21, Essen-Ruhr; Bonn Sektion, Wilhelmstr. 11, Bonn.
Niedersachsischer V. f. L. (E. V.) Hilkesheimer Bank, Filiale Gottingen, Gottingen.
Niederschlesisch-Markischer Verein fur Luftfahrt, Grunberg i. Schl, I.
Nordmark-Verein fur Motorluftfahrt (E. V.) Dusternbrooker Weg 38, Kiel.
Obererzgebirgischer V. f. L. (E. V.) Sa, Geschaftsstelle, Schwarzenberg i. S., Erla im Erzgebirge.
Oberrheimischer V. f. L. (E. V.) S. W., Blauwolkengasse 21, Strassburg i. Els.
Oberschwabischer V. f. L. (E. V.) S, Promenade 17, Uhn a. D.
Osnabrucker V. f. L. (E. V.) N. W., Wittekindstr. 4, Osnabrueck.
Ostdeutscher V. f. L. (E. V.) O, Courbierstr. 34, II, Graudenz.
Ostpreussischer V. f. L. (E. V.) O, Kneiphofische Langgasse 8 I, Konigsberg i. Pr.
Pfalzischer Luftfahrtverein Speyer, S. W., Speyer a. Rh, I.
Pommerscher V. f. L. (E. V.) Pasewalk (Stettin) F. 65.
Posener Luftfahrer-V. (E. V.) O, Posen, Kronprinzenstr, 101a.
Reichsflugverein (E. V.) Motztrs, 76, Berlin.
Rheinisch-Westfalische Motorluftschaff-Gesellsch. (E. V.) Bachstr. 21, Essen-Ruhr.
Saarbrucker Verein fur Luftfahrt, S. W. Saarbrucken, I.
Sachsisch-Thuringischer V. f. L. Belvedere-Allee 5, Weimar; Halle a. S. Sektion (E. V.) Halle a. Muhlweg 10 und Poststr. 6; Thuringische Sektion, Staaten; Belvederealle, 5, Weimar.
Schlesischer Aero-Club (E. V.) O, Schweidnitzerstr. 16-18 Breslau.
Schlesischer V. f. L. (E. V.) O, Schweidnitzerstr. 16-18 Breslau.
Schleswig-Holstein. Flieger-Club, N. W., Niemannsweg 81b, Kiel.
Seeoffizier-Luftclub (S.L.C.W.) N. W., Petersstr. 80 II, Wilhelmshaven.
Trierer Club. f. L. (E. V.) W., Nagelstr. 10, Trier.
V. D. Luftchiff-Industrieller, Kleiststr. 8, III, Berlin, W.
V. D. Motorfahrzeug-Industrieller, Potsdamerstr. 121b, Berlin, W.
V. f. Flugwesen in Mannheim, S. W., Lange Rotterstr. 106, I. Mannheim.
V. f. L. am Bodensee (E. V.) S, W., Zummsteinstr. 11, Schwedenschanze 3a, Konstanz.
V. f. L. Darmstadt, S. W., Darmstadt, I.
V. f. L. Gieben, S. W., Schlerweg 56, I., Gieben.
V. f. L. Kolmar (Posen), (E. V.) O. Privinzialbank, Kommanditgesellschaft a. A., Kolmar i. Pos.
V. f. L. Limbach (Sa, u. Umgegend) (E. V.) Postr. 5, Limbach (Sachsen).
V. f. L. in Mainz (E. V.) S. W., Grosse Bleiche 48, Mainz.
V. f. L. in Worms, S.W., Worms, I.
V. f. L. und Flugtechnik Nurnberg-Furth, Kharagasse 2 I, Nurnberg.
V. f. L. in Weimar (E. V.) Erfurter Str. 9, Weimar.
Vogtlandischer V. f. L. (E. V.) Sa, Plauen i. V, Furstenstr. 89.
Westfalisch-Lippischer Luftfahrtverein (E. V.) N. W., Kavalleriestr, Petri, Bielefeld.
Westfalish-Markischer Luftfahrer-Verein, Herne, I.
Westpreussischer V. f. L. (E. V.) O., Dr. Waldmann, Abteilung Schiffbau, Technische Hochschule, Danzig-Langfuhr.
Wissenschaftliche Gesellschaft fur Flugtechnik, Nollendorfplatz 3, Berlin W. 30.
Wurttembergischer Flugsport-Club, S. Hegelstr. 1b, Stuttgart.
Wurtembergischer V. f. L. (E. V.) S. am Salzmannsweg 21, Stuttgart.
Zwickauer V. f. L. (E. V.) Sa, Hauptmarkt 20, Zwickau i. S.

GERMAN MILITARY AVIATION.

Army General.

The new Army law provides £400,000 (80 million marks) for Army aviation (including dirigibles), in addition to a considerable share of the £4,000,000 which is being spread over a period of five years.

The Army aerial force is commanded by 2 inspector generals. The aviation force is put at 4 battalions.

Headquarters: Berlin. *Stations:* Aachen, Allenstein, Cologne, Darmstadt, Doeberitz, Freiburg, Graudenz, Hannover, Insterburg, Jüterbog, Koenigsberg, Metz, Posen, Strassburg, Zeithain.

The scheme will be complete by the end of the year.

Army Flying Schools.

Darmstadt (3, Kompagnia Flieger Bataillon 3).
Döberitz (1 und 2 Kompagnia Flieger Bataillon 1).
Freiburg (3 Kompagnie Flieger Bataillon 4).
Germersheim (Kgl. Bayerische Heeresverwaltung).
Graudenz (2 Kompagnie Flieger Bataillon 2).
Hannover (2 Kompagnie Flieger Bataillon 2).
Jüterbog (Truppenkommando).
Köln (1 Kompagnie Flieger Bataillon 3).
Königsberg (3 Kompagnie Flieger Bataillon 2).
Metz (2 Kompagnie Flieger Bataillon 4).
München-Oberschleissheim (Kgl. Bayerisches Flieger Bataillon).
München-Oberwiesenfeld (Kgl. Kommandantur).
Posen (1 Kompagnie Flieger Bataillon 2).
Saarbrücken (Kgl. Preussische Heeresverwaltung).
Schneidemühl (Kgl. Preussische Heeresverwaltung).
Strassburg (4 Kompagnie Flieger Bataillon 4).
Zeithain (3 Kompagnie Flieger Bataillon 2).

Army Aeroplanes.

The aeroplane force is as follows:—

Bought in 1912 **91 monoplanes** (20 *Bristol*, 1 *Dorner*, 2 *Etrich Taube*, 2 *Grade*, 6 *Harlan*, 20 *Mars*, 40 *Rumpler Taube*).

144 biplanes (50 *Albatros*, 12 *Aviatik*, 30 *Euler*, 10 *Otto*, 2 *L.V.G.*, 10 *Mars*, 6 *Wrights*).

Bought in 1913 **120 monoplanes** (*Albatross*, *Aviatik*, *Bristol*, *D.F.W.*, *Fokker*, *Gothaer*, *Jeannin*, *Rumpler*).

120 biplanes (*A.E.G.*, *Albatross*, *Aviatik*, *Bristol*, *D.F.W.*, *Euler*, *L.V.G.*, *Otto*.

Bought in 1914 or ordered sufficient to replace all the 1912 machines.

Under the new regulations, military machines must comply with the following conditions:—

1. Must be of entirely German manufacture, with ample and comfortable seating accommodation for pilot and passenger.
2. Design must permit of fitting bomb droppers and photographic apparatus.
3. Speed capabilities must not be less than 90 kilometres (56 m.p.h.)
4. Dimensions must not exceed 49 feet span (14·50 m.), 39 feet long (12 m.), 13 feet high (3·50 m.), and the motor not more than 100 h.p.
5. Minimum endurance, 4 hours.

Army Aviators.

to March, 1913.

Ackermann, Lt. K.
Albrecht, Ob-Lt. K.
Altrichter, Lt. K.
v. Apell, Lt. K.
Barends, Lt.
von Beaulieu, Ob-Lt. W.
Berlin, Ob-Lt. E.
Blume, Lt. W.
Boeder, Lt. O.
Braun, Lt.
Busch, Lt. H.
v. Butthar, Lt. W.
Canter, Lt.
Cips, T.
Coerper, W. Lt.
von Detten, Lt. G.
Demmel, Lt. M.
Dransfeld, Lt. E.
Eich, H.
von Eicksedt, Ob-Lt. V.
Erhardt, Ob-Lt. R. (110)
von Falkenhayn, Lt. F. E.
Graf Finck von Finckenstein, Lt. L.
Fisch, Lt. W. (107)
von Freyberg-Eisenberg-Allmendingen, Lt. F. E.
Funck, Lt. W.
Geerdts, F. H. (133)
von Gersdorff, Ob-Lt. E.
Geyer, Lt. H.
Goebel, Ob-Lt. W.
Grade, W. H. Sc. (29)
von Hadeln, Lt. F.
v. Hammacher, Lt. (49)
von Hammerstein Gesmold, Ob-Lt. F.A.
Hantelmann, Ob-Lt. M.
von Heildorf, Ob-Lt.
v. Hidelessen, F. Lt. (47)
Hildebrand, Ob-Lt. F.
Hofer, Ob-Lt. W.
Höpker, Lt. A.
von Jagwitz, Lt. F.
Joly, Lt. A.
Justi, Lt. K.
Kahl, H.
Kastner, Lt. H.
Keim, Lt. J. (127)
Keller, Lt. O.
Koch, Lt. W.
Kohr, Lt. R.
Lauer, Lt. R.
Lauterbach, Ob-Lt. F.
von Lichtenfels, Lt. S. (51)
von Linsingen, Lt. L.
Ludewig, F. Ob-Lt.
Meyer, Lt. W. (136)
von Minkwitz, Lt. H.
von Mirbach, Lt. K.
Mudra, Lt. H. (95)
Neumann, Ob-Lt. H.
von Obernitz, Ob-Lt. W.
Oelsner, Lt. W.
von Oertzen, Ob-Lt. J.
von Osterrold, Lt. P.H.
Petri, Ob-Lt. F. (129)
Pfeifer, Lt. L.
Pirner, Lt. H. K.
von Poser und Gross-Nädlitz, Ob-Lt. F.
Püschel, Ob-Lt. K.
Raymund, Lt. M.
Reiche, Lt. A.
v. Reichenberg-Wolfskeel, Graf. (93)
Reinhardt, Lt. S.
Reuss, Lt. W.
Ritter, Lt. K. (121)
Roser, H. H. (85)
Schäfer, Ob-Lt. L.
v. Scheele, Lt. A.
Schlegel, Lt. O.
Schneider, Lt. H.
Schreyer, F.
Schulz, Lt. J.
Schwartzkopff, Lt. H.
Sernes, Lt. E.
Sieber, Lt. H.
Solmitz, F. Lt.
Sommer, Lt. P.
Steinhoff, H.
Stieger, O. Lt.
von Stoephasius, Lt. M.
Striper, Lt. F.
Suren, Lt. E.
Suren, Lt. G.
Suren, Lt. H.
Taenfert, Lt. W.
v. Tiedmann, Ob-Lt. R. (17)
von Trotha, Ob-Lt.
Vogt, Lt.
v. Wedemeyer, Ob-Lt. E.
Wendler, Lt. W.
Weyer, Lt. G.
Wiegandt, Lt. W.
Wilberg, Ob-Lt. H. (26)
Wildt, Lt. K. (45)
Wirth, Ob-Lt. W. (92)
Wulff, Lt. A.
Zwickau, Lt. K.

GERMAN NAVAL AVIATION.

Army Aviators.—(*Continued*).

31st March, 1913 to 31st March, 1914.

Aigner, W., Ob-Lt.
v. Arnault, F., Ob-Lt.
Arntzen, G., Lt.
Baron v. Ascheberg, P., Ob-Lt.
Behm, A., Lt.
Bertram, Ob-Lt. O.
Birkner, Lt. H.
v. Blanc, H., Lt.
Bock, K., Lt.
Bonde, E., Lt.
Bongardt, G., Lt.
von Borcke, H. H., Lt.
Burckhardt, F. K., Lt.
Capuzzo, E., Haupt.
Christenn, A., Ob-Lt.
Clemens, E., Lt.
Cheriel, U., Haupt.
Coerper, Lt.
Denk, E., Ob-Lt.
von Detten, G., Lt.
Dietze, P., Ob-Lt.
Donnevert, W., Ob-Lt.
van der Drift, W., Mont.
Fahnert, F., Ob-Lt.
Findt, H., Lt.
Francke, C., Ob-Lt.
Friedensburg, Lt.
v. Gorrissen, K., Lt.
Gundel, E., Haupt.
Haack, H., Lt.
Freiherr v. Hadeln, Lt.
Hartmann, R., Ob-Lt.
Heintz, A., Lt.
Hempel, C., Ob-Lt.
Hermann, K., Lt.
Heydor, W., Ob-Lt.
Hüser, K., Ob-Lt.
Hüttig, B., Lt.
v. Jagwitz, F., Lt.
Illing, O., Lt.
Keske, G., Lt.
Kiesel, W., Haupt.
Krueger, E., Lt.
Krug, M., Lt.
Kuhlmann, L., Lt.
Ladewig, H., Lt.
Langfeld, Ob-Lt. W.
Lauer, Lt. R.
Linke, A., Lt.
v. Lissingen, L., Ob-Lt
v. Livonnius, J., Lt.
Löhlffel von Lowensprung, F., Ob-Lt.
Ludewig, F., Ob-Lt.
Mackenthun, W., Lt.
Mikulski, K., Lt.
Milkoff, R. Bul., Ob-Lt
Minster, F., Lt.
Müller, L., Lt.
Niemela, E., Lt.
Oelsner, W., Lt.
Parschau, O., Lt.
Pokristev, P., Ob-Lt.
Graf v. Rambaldi, J. C., Lt.
Reinert, K., Lt.
Roesch, R., Lt.
De le Roi, W., Haupt. a. D.
Scherkamp, O., Lt.
Schiller, H., Lt.
Schnell, H., Lt.
Schrogel, H., Lt.
Schroff, H., Lt.
Schröder, B., Lt.
Schwandner, H., Lt.
Serno, E., Lt.
Siber, H., Lt.
Siegroth, A., Lt.
v. Skrbensky, E., Ob-Lt.
Solmitz, F., Lt.
Speer, H., Lt.
Steffen, H., Ob-Lt.
v Stoephasius, W., Ob-Lt.
Striper, F., Lt.
Suren, E., Lt.
Thelen, O., Lt.
Thomessen, T., Ob-Lt. z. S.
Uhlig, E., Lt.
Viehweger, J., Lt.
Weber, E., Lt. a. D.
Wentscher, B., Lt.
Wiebeck, O., Lt.
Wimmer, E., Lt.
Wulff, A., Lt.
Wuthenow, K., Lt.

Navy General.

The 1913 expenditure on naval aviation (including dirigibles) was £250,000 (50 million marks), plus a portion of the special expenditure.

Naval Flying Schools and Stations.

Kiel. **Putzig** b. Danzig. **Wilhelmshaven.**

Navy Aeroplanes.

Early in 1914 the total effective force was 36 seaplanes as follows:—

1912 { **4 monoplanes** (*Rumpler*).
10 biplanes (4 *Albatros*, 2 *Curtiss*, 4 *Euler*).

1913 { **2 monoplanes** (*Rumpler*).
30 biplanes (*A.G.O., Albatros, Aero, Curtiss, Wright*).

Total **14** old and **32** new machines.

Navy Aviators.

(To March, 1913).

Bertram, Ob-Lt. (123)
Coulmann, W.
Francke, C., Ob-Lt. (142)
Goltz, K., Kap-Lt.
von Gorrissen, Lt. (4)
Hartmann, R., Ob-Lt. (96)
Hering, M., Kap-Lt.
Janetzky, W., Kap-Lt.
Langfeld, W., Ob-Lt.
Prinz Heinrich von Preussen (38)
Schroeter, W., Ob-Lt.
Steemler, B.

(April 1913, to March 31st, 1914).

Goltz, K., Kap-Lt.
Hering, M., Kap-Lt.
Berthold, Kap-Lt.
Hornel, W., Kap-Lt.
Klein, H. W., Lt. z. S.
Kuntz, E., Kap-Lt.
Mügge, W., Kap. Merchant Service
Müller, E., Ob-Lt. z. S.
von Prondzynski, Lt. z. S.
Schroeter, W., Ob-Lt. z. S.

GERMAN PRIVATE AVIATORS.

To end of March, 1913. Many available for war duties.

Private Aeroplanes.

At end of March, 1914, the number of private aeroplanes in Germany was about 80, of which most were school, etc., machines.

Abelmann, Carl
Abramowitch, Wassewolod
Albers, Wilhelm
Alig, Ernst.
Arntzen, Orla, Dr. Jur.
Schirrmeister, Hans
Badowski, Ludwig
Baierlein, Anton
Basser, Gustav
Beck, Otto
Becker, Reinhold
Beese, Frl.
Behrend, Adolf
Berliner, Rudolf
v. Bieber, Harald, Dr. jur.
Birkmaier, August
Blattmann, Ernst
Bohlig, Edmund
Bosenius, Rudolf
Bossin, Fritz
Boutard, Charles
Braselmann, Karl
Breton, Raymond Arthur
Broeiner, Marco
Brunnhober, Simon
Büchner, Bruno
Charlett, Willi
Clauberg, Fritz
Cremer, Fritz
Curdts, Carl
De Waal, Bernard
Dick, Fritz
Donnewert, Willy
Dorner, Hermann
Dücker, Werner
Eberhardt, Alfred
Eckardt, Willy
Eckelmann, Frank
Engelhard, Paul
Erblich, Heinz
Euler, August
Evers, Heinrich
Eyring, Raymund (Dr. Huth)
Falderbaum, Heinz
Faller, Artur
Faller, Otto
Flegler, Th. v.
Fokker, Anthony
Fremery, Hemmann
Friedrich, Alfred
Gasser, Hermann
Geiss, Franz
Georgi, Johannes
v. Gorrissen, Ellery
Grade, Hans
Grisel, Otto, Leutnant a D.
Grulich, Karl
Grünberg, Arthur
Haas, Heinrich
Hansen, Hans
Hanuschke, Bruno
Hartmann, Alfred
Hasenkamp, Emil
Hässler, Hugo
Heim, Oskar
Heirler, Paul
Hennig, Alfred
Hess, Robert
Heydenreich, Fritz
Hild, Lac.
Hintner, Cornelius
Hirrlinger, Albert
Hirth, Helmuth
Hoff, Wilhelm
Hoffmann, Siegfr.
Hoos, Josef, Dr. jur.
Hormel, Walter
Horn, Albin
Hoesli, Gordian
Ingold, Karl
Jablonski, Bruno
Jahnow, Reinhold, Leutn. d. Landw.
Jänisch, M.
Jeannin, Emil
Kahnt, Oswald
Kammerer, K. F. Ludwig
Kaniss, Gustav
Kanitz, Willy
Karsten, Otto
Kaspar, Referendar
Katzian, Artemy
Keidel, Frideolin
Kern, Willy
Kiepert, Rudolf
Kleinle, Josef
Kober, Theodor
Köhler, Erich
Köhnert, Herbert
König, Benno
König, Martin
Krastel, Heinz, Reimar
Krieg, Friedrich
Krieger, Karl
Krüger, Leutnant a. D.
Krüger, Arthur
Krumsiek, Wilhelm
Kühne, Ernst Herbert
Kunze, Ernst
Kurtscheid, Nicolaus
Ladewig, Heinz.
Ladewig, Herbert, Leutnant, Inf.-Regt.
Lagler, Fräulein Bozena
Laitner, Felix
Laemmlin, Charles
Lange, Paul
Langer, Bruno
Lecoutre, Ingenieur
Lenk, Willy
Lechte, Carl
Lie, Christian
Lindpaintner, Otto E.
Linnekogel, Otto
Lissauer, Walter
Lochner, Erich
Loew, Karl
Labbe, Fluglehrer
Manhardt, Alfred Willy
Meute, Willy, Oberleutnant a. D.
Meybaum, Theodor
Michaelis, A.
Mischewsky, Bernard
Mohns, Karl
Möhring, Charlotte
v. Mossner, Robert, Oberleutnant a. D.
Mügge, Wilhelm, Kapitan d. Handelsmarine
Müller, B. O. Oscar
Müller, Friedrich
Müller, Karl
Müller, Kurt
Munkelt, Kurt
Müruu, Georg
Netzow, Georg
Niemela, Edmund, Leutnant a. D.
Noelle, Max
Oelebeck, Heinrich
Oster, Franz
Ottenbacher, Ernst
Otto, Gustav
Paul, Alfred
Pentz, Hermann
Pietschker, Alfred
Plaezikowski, Udo
von Platen, Horst
Plochmann, Ernst
Pokristev, Penu, Oberleutnant
Poulain, Gabriel
Raelack, Josef
Reichhardt, Otto
Rentzel, Adolf
Rode, Franz
de le Rok, Wolfram
Roempler, Oskar
Rosenstein, Willy
Roessler, Fritz
Rost, Gottlieb
v. Rottenburg, Otto
Roever, Hans
Rupp, Albert
Rütgers, August
Schadt, Karl
Schäfer, Otto
Schakowskoy, Fürstin Eugenie
Schall, Karl
Schauenburg, Theodor
Schendel, Georg
Scherff, Maurizio
Schiedeck, Hermann
v. Schimpf, Ernst, Dr. jur.
Schirrmeister, Hans
Schlatter, Joseph
Schlegel, Ernst
Schlüter, Fritz
Schmidt, Erich.
Schmidt, Richard
Schmigulski, Hans
Schöner, Georg
Schultze, Gustav
Schüpphaus, Heinrich Ernst
Schwandt, Paul
Schwarz, Erwin
Seidlmayer, Gerhard
Sengpe, Paul
Seydler, Frank
Siewert, Lotharm
Steffen, Bruno
Steinbeck, Hans.
Stiefvater, Otto
Stöffler, Victor
Stoldt
Stolphasius, Curt von
Strack, Karl
Strack, Peter
Stüber, Joachim, Leutnant d. R.
Suvelack, Josef
Thelen, Robert
Thiele, Erich
Toepfer, Otto
Trautwein, Max
Treitschke, Friedrich
Tybelski, Franz
Tyroer, Gustav
Vollmöller, Hans
Wecsler, Rubin
Weickert, Julius Artur
Weinzug, Ernst
Werntgen, Bruno
Wertheim, Paul
Weyl, Richard
Wienczierz, Eugen
Wieting, Werner
Wirtz, Reinerm
Witte, Gustav
Wittenstein, Oskar, Dr.
Witterstätter, E. W.
Wolter, Richard
von Zastrow, Alexanderm

The following German aviators have been killed:—

1896.
Lilienthal
1910.
Haas, Lieut.
Mente, Lieut.
Plochmann
Robl, Thaddeus
1911.
Bockmüller
Bournique (" Pierre Choendel [Marie")
Dax
Englehardt, Kapt.
Eyring, R.
Frh. v. Freytag-Loringhoven
Laemmlin
Lecomte
Neumann, Lieut.
Reeb
Pietschker
Schendel, G.
Stein, Lieut.
Tachs
Voss
1912.
Alig
Altrichter
Beissbarth
Berger
Birkymayer
Buchstätter
v. Falkenhayn
Frh. v. Schlichting
Fischer
Hausburger
Hofer
Hösli
Junghans
König
Kugler
Lachmann
Lang
Lihau
Meyer
Preusser
Pochmeyer
Rheinle
Rost
Schmidt
Schmigulski
Stille
Werntgen
Witte

Note.—Abramowitch was a Russian by birth (killed April, 1913).

2 F

GERMAN PRIVATE AVIATORS.—*Continued.*

(All available for war duties.)

Qualified March, 1913, to March, 1914.

Adler, gen, Wackwitz, Richard
Anders, Gerhard
Anslinger, L. mstr.
v. Arnim, H.
Arns, E., Tech. Prak.
Bähr, H.
Ballod, O.
Banninger, H., Dr.
Beckmann, K.
Behling, A.
Behrbohm, M.
Belohavek, geb. G. H.
Bernius, K. H.
Bill, H.
Blank, B.
Bodenburg, P.
Boehm, R.
Boehm, S. S.
Bohne, B. M.
Bramhoff, W.
Brand, A., Ing.
Braumüller, G.
Braun, K.
Breetsch, R.
Breitbeil, O., stud. ing.
Briesemeister, H.
Brock, W.
Brudereck, H.
Bruno, M.
Burggraf, H.
Caspar
Christiansen, F., Kapt.
Cipa, T., Unteroffizer
Coulmann, Wil. Kgl. Mar. Sch. mstr.
Culin, H.
Cüppers, W.
Dahm, H.
Dähn, H., Ref.
Degener, W.
Denicke, K. A.
Dennewitz, A.
Dirks, L., Mech.
Ditzuleit, Ernt.
Donast, E.
Donner, W., Mont.
Dopbicke, R.
Dorner, Ing.
Dörfler, A.
Drege, A. ing.
Dreschler, A. Hartmann, K. K.
Eckhardt, W., stud. ing. Hebart, K.
Ehrhardt, P. Hechtfischer, L., Flugtech.
Engelhorn, F., stud. ing. Heidenreich, F.
Engelmann, J.
Enskat, F., Ing.
Ernst, W., Reg. bau.
Eversbusch, W., Ing. Bautechniker.
Fick, M.
Fischer, R., Arch.
Flügge
Forster, E., Med. Prak.
Franke, A.
Frankl, W.
Freindt, R.
Freund, Dr.
Freund, F.
Frey, A.
Frobenius, F.
Gailis, T.
Garba, H.
Gaertner, M.
von Gienanth, Freiherr Eb. Flug.
Girod, K.
Gitsels, H. med
Glöer, Fr. W.
Gollnick, Leo., Elek.
Griebsch, W.
Grohnwald, H.
Grökel, H.
Grosse, O.
Grulich, K., Dipl. Ing.
Grunser, B.
Grunser, G.
Grunewald, K., Sergt.
Grunow, O.
Gutermuth, H.
Gutschmidt, P.
Hause, E.
Haase, G.
Habich, H.
von Hahn, E.
Hahn, W.
Haller, M.
Hammer, F., Ing.
Hammer, O.
v. Hammerstein-Gesmold, Fr., A.
Hans, G., Mont.
Hansen, Hans, Ch.
Hanuschke, W., stud. ing.
Hartmann, K. K.
Hebart, K.
Hechtfischer, L., Flugtech.
Heidenreich, F.
Heidt, F., Flug.
Heim, O., Ing.
Heinemann, R. Ing.
Heiter, J.
Helktriegel, F. A., s. Bautechniker.
Heller, O., Tech.
Hellerscheidt, H., meister
Henkel, H., stud. ing.
Heppe, U., Enter- offizier
v. Herff, E.
Herold, F., Leipzig Gohlis
Hess, E.
Heyer, E., Ing.
Hillmann, W.
Hinsen, H., stud. ing.
Hoefig, W.
Hoffmann, B., Tech.
Höhndorf, W., Ing.
Holle, H.
Hörmann, L., cand. med
Hozakowski, Sig.
Huber, A.
Hucke, F.
Huth, F., Dr. O.
Jahn, F., Tief.
Jannsen, W., Maschin- bauer.
Joos, C. ing.
Isebe, O., Mar. ing.
Iwan, R.
Kästner, E.
Kempter, F. tech.
Kerks, F., Mont.
Keuch, A.
von Keussler, O.
Kiessling, W., Mont.
Klingenberg, R.
Knust, O., Ing.
Koekrow, H.
Koester, Dr., jur.
Krämm, F., Ing.
Krämm, G., Unter- offizier
Krause, W., stud. ing.
Kreuter, K., stud. ing.
Kreutzer, M., ing.
Kruse, J.
Kulsch, E., Tech.
Künne, K.
Kuntzner, F., Mech.
Küppers, K., stud. ing.
Landmann, W.
Lang, C.
Lang, O.
Lange, A., Marineing
Lange, A.
Lange, H.
Lange, P.
Langwitz, T., Werk- meister
Lawrenz, T.
Lichtherz, K., stud. rer. techn.
Lieben, G.
Liebmann, E.
Liedtke, K. O.
Lindner, C.
Lindner, O., stud. ing.
Linke, B.
Lintzkogel, O.
Liske, A., Unter- offizier
v. Loessl, Ernt. Ritter und Edler, Stud. Mach.
Lübbert, R. K.
Lüke, K., Ing.
Luther, G.
Malchow, Hans, studrer. tech.
Manger, K.
Mann, F.
Margraf, A., Sergt.
Marzall, Hans, stud. ing.
Matthies, W.
Maurer, J. J.
May, R., stud. rer. tech.
Mayweg, H., stud. med.
Meess, Leo
Meiss, H.
Meissner, G., Mont.
Meyer, L. met. et
Michailoff, W., Ing.
Michalowitz, K.
Michel, W.
von Mises, R., Prof. Dr. Ed.
Moerschel, R. F.
Molina, K. K.
Moll, J., Tech.
Moeller, F.
Moosmaier, J.
Müller, P.
von Mumm, W.
Muth, A.
Muller, F.
Müller, K., Mech.
Müller, K.
Müller, P., Sergt.
Nestler, G.
Neubauer, R.
Neumann, Hans
Neumann, P., Tech.
Nischwitz, A.
Nolting, W., stud. ing.
Odebrett, K., Ing.
Oehler, J.
Oelrich, H.
Oesterreicher, A.
Ongsiek, K.
Oppermann, P.
Oster, F., Fabrik.
Paschen, W.
Patberg, H., Ing
Peckmann, W.
Petersen, G.
von Ploetz, G., cand. jur.
Pollandt, Max.
Pollner, P., stud. polt.
Polozek, J., Sergt.
Ponater, A., Mont.
Prenzel, G.
Preussner, C. L.
Puschmann, A., Mech.
Rast, M., Tech.
Rehse, G.
Reichelt, H., Ing.
Reimers, F.
Reinhardt, S., Lt.
Reinmann, W., Ing.
Reiterer, F.
Reuber, E.
Reichländer, F.
Richard, H.
Rieger, G., Chauf.
Riessler, W.
Rieth, O., stud. rer. met. et
Ritser, E.
Rode, F., stud. mach.
Roitsch, P. ing.
Roosen, R. K.
Rosenfeld, F.
Ross, Hans, P.
Roth, L.
Rover, H.
Sabersky-Mussigbrodt, K.
Sarnighausen, F.
Schachenmayr, G. G.
Schäfer, P. A.
Scheiner, H.
Scheuermann, E.
Schillin, A.
Schlegel, O., stud. ing
Schleiffer, M.
Schlossarezky, A.
Schlüter, B.
Schlüter, F. L.
Schmelz, H. A.
Schmidt, A.
Schmidt, A. K.
Schmidt, E. K.
Schmidt, G.
Schmidt, K.
Schoenfelder, C.
Schulvinus, E.
Schreyer, F., Unter- offizier
Schroeder, F. K.
Schroeder, R.
Schroeder, W., Dipl. Ing.
Schröter, B. E.
Schuchardt, H.
Schüler, M.
Schult, N., Ing.
Schulz, H.
Schumann, E., stud. ing.
Schuster, H.
Schütz, O.
Schützenmeister, O., Ing.
Schwade, J., Ing. u. Fab.
Schwahn, L.
Schweizer, F., Mech.
Sedlatzek, K.
Sedlmayr, H., Tech.
Senzig, F., Ziv. ing.
Sedlar, F.
Sido, F.
Sitto, F.
Sommer, R.
Sonntag, B.
Spachholz, Aug. stud. ing.
Sprenger, E., Maune- ing.
Springefeld, K.
Stackler, E.
Stagge, W.
Steffen, F., Ing.
Steffens, E., Dr.
Stehle, K.
Steindorf, H., Unter- offizier
Stemmler, B., Marine- Ober. ing.
von Stenglin, F. E.
Steyer, H.
Stockhausen, J.
Stoeffler, E. P.
Strang, P., cand. ing.
Strauch, W., Ing.
Ströbel, A.
Taubenheim, O.
Taufler, A.
Teigeler, P.
Thelen, R., Diplom- Ing.
Thiele, W.
Tille, W., cand. ser. elec.
Troost, A.
Trück, W.
Truckenbrodt, W., Ing
von Tschirschky-Bögendorff, Ober-lt. z S.
Ungewitter, C.
Vieth, W.
Voigt, T.
Vollrath, W., stud. ing.
Vongehr, C., stud. jur.
Vorländer, J. H.
de Wall, B.
Weidner, P., Over- mont
Weigel, O.
von Weiher, R.
Weinang, E., Ing.
Weingärtner, M.
Weiss, F.
Weiss, H.
Weiss, J.
Wendt, W., Ing.
Wieland, L.
Winter, H.
Wippermann, C.
Wlodarski, B.
Wolf, J.
Wrobel, H., Ing.
Wunderlich, H.
Zahn, H.
Zentsytzki, Stan. stud. mach.
Ziegler, A., Tech.
Ziegler, G.
Ziemens, K.
Zottmann, W., Sergt.
Zwickau, W., Sergt.

1913.

Hild
Schlegel
Jenetzki, Kap-Lt. (Navy)
Obermaschinisten-maat Dickmann (Navy)
Lenk
Helfenrider, Unter-offizier (Army)
Lichter
v. Myrbach, Lt. (Army)
v. Brunn, Lt. (Army)
Dietrich
Juckter
Michaelis
Horn
Gerbitz
Krastel
Dietricks
Stoll, Lt. (Army)
Westphely, Sergt. (Army)
Stengler
Brooks
Rössler
Rütgers
Lt. Schmidt (Army)
Kahl, Unter-offizier (Army)
v. Eckenbreher, Lt. v. (Army)
Prins, Lt. (Army)
Senge
Dr Ringe
Lorenz
Schulz, Oberleut (Army)
König, Lt. (Army)
Oberleut Koch (Army)
Mantel
Oberleut Freiher v. Freyberg (Army)

To March, 1914.

Oberleut Mayer (Army)
Lt. Faber (Army)
Lt. Kunz (Army)
Lt. de Lesser (Army)
Oberleut Gondardt (Army)
Hauptmann Rennhardt (Army)
Lt. Lankmeyer (Army)
Reichelt
Frl. Reichelt

A

A.E.G. Allgemeine Elektrijitah Gesaltschaft. Nieder-Neuendorf, Berlin. Established 1913.
Capacity: 200 per annum.

A.E.G. biplane.

Model and date.	1913-14. Biplane.	
Length .. ... feet (m.)	31½	9·50
Span ... ... feet (m.)	54½	16·60
	34½	10·50
Area ... ... sq. feet (m².)	...	...
Weight ... machine, lbs. (kgs.)	1433	650
useful lbs. (kgs.)	880–1100	400–500
Motor... ... ... h.p.	100 N.A.G. or Mercedes	
Speed... ... m.p.h. (km.)	60	95
Number built during 1913 ...	10	

AGO. A.G.O. Flug zeugwerke, G.m.b.H., Berlin. Capacity : about 50 per annum.

Model.	1913-14. Normal Biplane.		M 1913-14. Kavallerie Monoplane.	
Length ... ... feet (m.)	32¾	*10*	21	*6·50*
Span ... ... feet (m.)	46	*14*	32¾	*10*
Area ... ... sq. feet (m^2.)	344	*32*	...	
Weight ... total ... lbs. (kgs.)	...	...	...	
Weight ... useful... lbs. (kgs.)	...	...	...	
Motor ... ... h.p.	100 Mercedes		120 Mercedes	
Speed ... max. m.p.h. (km.)	75	*120*	95	*150*
Speed ... min. m.p.h. (km.)	...		...	
Endurance ... ... hrs	...		...	
Number built in 1913	30		8	

Biplane.

Monoplane.

ALBATROS. Albatroswerke G.m.b.H, Flugzeugfabr. u. Fliegerschule, Johannisthal bei Berlin. Established 1910. Capacity: 250—300 machines a year.

Taube.

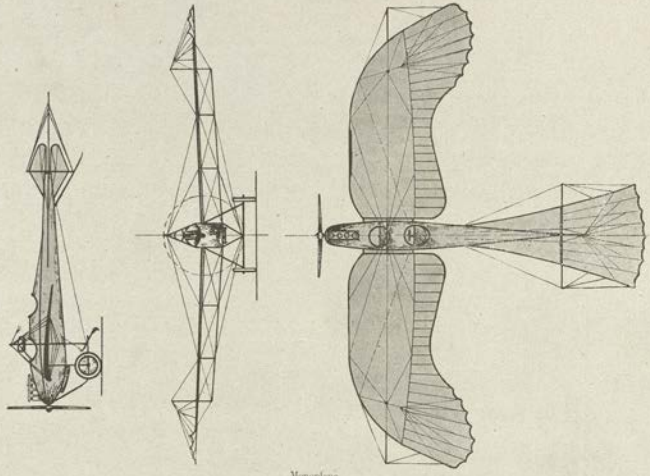
Waterplane.

Model and date.	DD 1 1914. biplane.	DD 2 1914. biplane.	WDD 1914. water-biplane.	EE 1914. monoplane.
Length ... ... feet (m.)	26½ *8·0*	26½ *8·0*	29½ *9·0*	29½ *9·7*
Span ... ... feet (m.)	47½ *14·5*	42½ *12·96*	53½ *16·3*	45 *13·7*
Area ... ... sq. feet (m²)	480 *44·6*	430 *40·0*	576 *54·0*	323 *30*
Weight ... { total ... lbs. (kgs.)	1499 *680*	1477 *670*	1940 *880*	1433 *650*
{ useful lbs. (kgs.)	... ...	... ...	... ...	... ...
Motor ... ... h.p.	100 Mercedes	100 Mercedes	100 Mercedes	100 Mercedes
Speed ... { max. m.p.h. (km.)	65 *105*	67 *108*	59 *95*	68 *110*
{ min. m.p.h. (km.)	... ...	... ...	... ...	... ...
Number built during 1913 ...	*Altogether*	*about* 200		

Military Biplane.

[See next page.

ALBATROS—*continued.*



Monoplane.

A—*continued.*

AVIATIK. Automobil & Aviatik A.G., Mülhausen i.E. Established 1910. Capacity: about 300 a year.

1914 biplane.

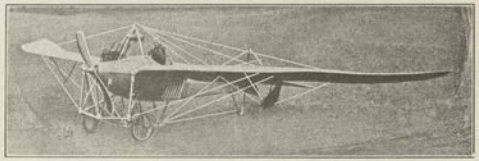
1913 tractor-biplane (racer).

Model and Date.	P 14 1913.	P 15, 1914.	P 20, 1914.	WP 18, 1914 Hydro.	WP 19, 1914 Hydro.	P 16, 1914.
Length ... ... feet (m)	28½ 8·70	25⅝ 7·80	23¾ 7·20	31½ 9·50	28½ 8·80	23 7·00
Span ... ... feet (m)	46 14·00	39½ 12·00	34½ 10·50	42½ 13·00	42½ 13·00	32⅝ 10·00
Area ... sq. feet (m²)	483 45	430 40	345 32	483 45	483 45·00	323 30
Weight { total lbs. (kgs.)	1543 700	1400 680	1102 500	1984 900	1984 900	904 410
Weight { useful lbs. (kgs.)	...	...	...	...	...	...
Motor ... ... h.p.	100 Mercedes	100 Mercedes	100 Gnome	150 Benz	135 Salmson	80 Gnome
Speed { max. m.p.h. (km.)	65 105	72 115	75 120	75 120	72 115	62 100
Speed { min. m.p.h. (km.)	...	...	...	...	...	...
Number built during 1913	200 *of various kinds.*	...	...	...	...	...

Seaplane.

B

B.F.W. Brandenburgische Flugzeug-werke, G.m.b.H. Brandenburg a H. (formerly *Etrich*). Capacity: 50 a year.



	1913. **Etrich** (original) *Taube*, monoplane.	
Length ... ... feet (m.)	31	*9.5*
Span ... ... feet (m.)	47½	*14.4*
Area ... ... sq. feet (m².)	301	*28*
Weight (Total ... lbs. (kgs.) / Useful ... lbs. (kgs.)	1323	*600*
Motor ... ... h.p.	100 Mercedes or Argus	
Speed ... (max. m.p.h. (km.) / min. m.p.h. (km.)	71 to 75	*115 to 120*
Endurance ... ... hrs.	6	

Remarks.—

D

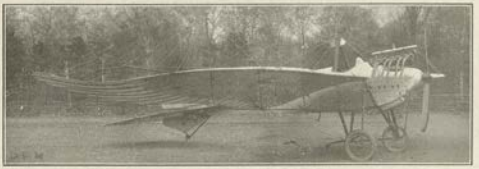
DEUTSCHE SOMMER. Deutsche Sommer Flugzeugwerke, Darmstadt. Capacity: small.

	Biplane.	
Length ... ... feet (m.)	26½	...
Span ... ... feet (m.)	32½	...
Area ... ... sq. feet (m².)	344	...
Weight ... (total ... lbs. (kgs.) / useful lbs. (kgs.)	...	...
Motor ... ...h.p.	various.	
Speed ... (max. m.p.h. (km.) / min. m.p.h. (km.)	69	*110*
Endurance ... ... hrs.	4½	
Number built during 1913. ...	4	

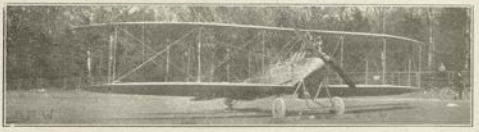
D—*continued.*

D.F.W. Deutsche Flugzeugwerke, G.m.b. H., Leipzig, Lindenthal. (Formerly known as *Mars*).
Capacity :

Model and Date.	D.F.W. Steel "Taube." Military. 1914.	D.F.W. Military biplane. 1914.
Length ... ... feet (m.)	32½ *10·00*	27½ *8·40*
Span ... ... feet (m.)	46½ *14·20*	46 *14·00*
Area ... ... sq. feet (m².)	366 *34*	431 *40*
Weight ... { total ... lbs. (kgs.)	1370 *620*	1430 *650*
{ useful lbs. (kgs.)	... ...	... ...
Motor ... ... h.p.	100 Mercedes	100 Mercedes
Speed ... { max. m.p.h. (km.)	...	...
{ min. m.p.h. (km.)	72 *115*	75 *120*
Number built during 1913 ...	*about 80 all told.*	



Steel "Taube."

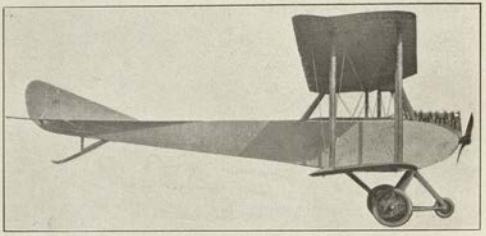


Military biplane.

E

EULER. August Euler, Frankfurt a.M. In 1908 Euler secured *Voisin* rights for Germany. In 1910 he took out a patent for a design of his own. In the summer of 1911 he built a successful monoplane, in the autumn of the same year a triplane. Capacity: 200 a year. Existing models are as follows :—

		1912. Triplane.	1913-1914. Military biplane.
Length	... ... feet (m.)	23 7	29⅓ 9
Span	... ... feet (m.)	23 7	44⅓ 13·50
Area	... ... sq. feet (m².)	...	344 32
Weight	total ... lbs. (kgs.)	...	...
	useful ... lbs. (kgs.)	...	...
Motor	... ... h.p.	Gnome	100 Mercedes
Speed	max. m.p.h. (km.)	56 90	*Ca* 65 *105*
	min. m.p.h. (km.)	...	... ...
Endurance	... ... hrs.	3—4	6
Number built during 1913 ...		about 70 of various types	



1914 Military biplane.

1913 Military biplane.

F

FOKKER. Monoplanes. Fokker-Aeroplanbau, Schwerin-Gorris in Mecklenburg. Capacity: 40.

	1912-13. A.	1912-13. B.	1912-13. C.	1913. Hydro-aeroplane.	1914 Monoplane.
Length ... ... feet (m.)	29½ *9*	29½ *9*	29½ *9*	31 *9·50*	Morane Type.
Span ... ... feet (m.)	42¾ *13·20*	42¾ *13·20*	42¾ *13·20*	52½ *16·20*	
Area ... sq. feet (m²).	280 *26*	280 *26*	280 *26*	...	
Weight (total lbs. (kgs.)	970 *440*	1146 *520*	1190 *540*	...	
(useful lbs. (kgs.)	...	...	...	...	
Motor ... ... h.p.	70 Argus or Dixi	100 Argus	70 Renault	100 Renault or Mercedes	
Speed ... (max. m.p.h. (km.)	52 *83*	60 *96*	53 *85*	59 *95*	
(min. m.p.h. (km.)	43 *70*	...	...	...	
Endurance ... hrs.	5—8	5—8	4—6	4	
Number built	6	5	2	...	

Remarks.—The *Fokker* is a machine of Dutch origin. (See DUTCH).

1913 model.

Hydro. 1913.

F—*continued.*

FLUGZEUGBAU FRIEDRICHSHAVEN. G.m.b.H., Friedrichshafen a. Bodensee.

	1913-14. Hydro-mono.	1913-14. Water-biplane.	1914. Hydro-biplane.
Length ... feet (m.	32¼ *10*	36 *11*	
Span ... ... feet (m.	(32¼ *10* (42¼ *13*	46 *14*	
Area ... sq. feet (m².)	...	431 *40*	*No data.*
Weight (total lbs. (kgs.	...	...	
(useful lbs. (kgs.	...		*See photo.*
Motor ... ... h.p.	60 ——	100 Mercedes	
Speed ... m.p.h. (km.)	62 *100*	56 *90*	
Endurance ... hrs.	5	5	
Number built during 1913	3	6	

G

GOEDECKER. J. Goedecker, Flugmaschinen-Werke, Niederwalluf a. Rh. Flying School: Flugplatz Grosser Sand bei Mainz. Capacity: small.

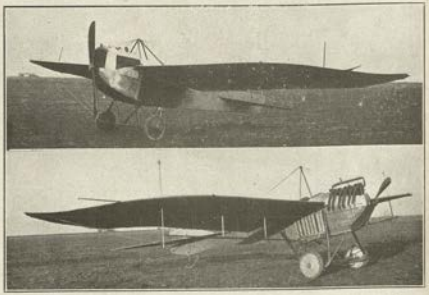
Model and date. Monoplanes.	1912. Monoplane "Sturmvogel."	1913-14.
Length ... ... feet (m.	32¾ *10*	36 *11*
Span ... ... feet (m.	47¼ *14·5*	45 *14*
Area ... sq. feet (m².)	387 *36*	387 *36*
Weight (total ... lbs. (kgs.	992 *459*	1102 *500*
(useful lbs. (kgs.	...	771 *350*
Motor ... ...h.p.	100 Dixi	100 Mercedes
Speed ... m.p.h. (km.)	56 *90*	62 *100*
Endurance ... ... hrs.	...	6
Number built	8	10

G—*continued.*

GOTHAER WAGGONFABRIK A.-G.

Abt. II. Flugzeugwerke, Gotha.
Capacity: 300.

Model and date.	"Taube." L D 1913.		"Taube." L E 1913.		Biplane. R L D 1.		Biplane. R L D 2.		Waterplane. W D 1.		Light biplane L D 1.		Light biplane. L D 2.	
Length ... ... feet (m.)	33½	*10·22*	28½	*8·6*	28½	*8·6*	27½	*8·5*	34½	*10·5*	26½	*8·0*	23½	*7·20*
Span ... ... feet (m.)	47½	*14·4*	46½	*14·2*	47½	*14·5*	39½	*12·0*	49½	*15·0*	40	*12·25*	39½	*12·0*
Area ... sq. feet (m²)	323	*30·0*	301	*28*	533	*50*	430	*40*	576	*54*	344	*32·0*	328	*30·5*
Weight { machine, lbs. (kgs.)	1543	*700*	1323	*600*	1477	*670*	1212	*550*	1651	*740*	849	*385*	992	*450*
Weight { useful ... lbs. (kgs.)	882	*400*	882	*400*	1102	*500*	838	*380*	992	450	606	*275*	541	*245*
Motor ... ... h.p.	100 Daimler-Mercedes		100 Daimler-Mercedes		100 Daimler-Mercedes		100 Gnome		100 Gnome		80 Gnome		100 Gnome	
Speed max. m.p.h. (km.)	62	*100*	72	*115*	70	*110*	75	*120*	56	*90*	56	*90*	70	*110*
Number built	...		...		...		...		...		...		...	



Gotha. "Taube."

G—*continued.*

GRADE. Hans Grade Fliegerwerke, Bork, Post Brück (Mark). Founded 1910 by H. Grade, who was the first man in Germany to fly with a German machine. Capacity: about 70 a year.

Model and date.	A. single-seater.	B. two-seater.	C. three-seater.
Length ... ... feet (m.)	19½ *6*	23 *7*	26½ *8*
Span ... ... feet (m.)	27½ *8·50*	34½ *10·50*	39 *12*
Area ... ... sq. feet (m².)	215 *20*	323 *30*	43 *40*
Weight ... { machine, lbs. (kgs.)	287 *130*	396 *180*	507 *230*
{ useful ... lbs. (kgs.)	... ...	... ...	... ...
Motor ... ... h.p.	20-30 Grade	30-45 Grade	45-70 Grade
Speed ... ... m.p.h. (km.)	... ...	...	...
Number built during 1913 ...	*About 50 services*		

Notes.—*A* rides 1,000 metres in 10 minutes; *B* in 8 minutes or (with passenger) 12 minutes; C in 6 minutes, or 9 with one, and 12 with two passengers.

H

HANUSCHKE. Bruno Hanuschke, Flugzeugbau, Johannisthal b. Berlin. Capacity: small.

	1914.
Length ... ... feet (m.)	21 *6·50*
Span ... ... feet (m.)	32 *10·20*
Area ... ... sq. feet (m².)	160-183 *15-17*
Weight ... { total ... lbs. (kgs.)	... ...
{ useful... lbs. (kgs.)	... ...
Motor ... ... h.p.	50 Gnome
Speed ... ... m.p.h. (km.)	62 *100*
Endurance ... ... hrs.	4
Number built	1

J

JATHO.

Hannoversche Flugzeugwerke, G. m. b. H., Jatho, Stader Chaussee 32, Hannover. Karl Jatho built his first aeroplane in 1899, and has produced machines at intervals ever since. Capacity: 50.

	Steel monoplane 1913.		Sports monoplane 1914.		Steel monoplane 1914.		Hydro monoplane 1914.		Water biplane 1914.	
Length ... feet (m.)	30½	9·4	30½	9·2	30½	9·2	30½	9·4	33½	10·2
Span ... feet (m.)	47½	14·5	32½	10·	47½	14·5	47½	14·5	59	18·0
Area ... sq. feet (m².)	323	30	215	20	322	30	344	32	576	54
Weight (total ... lbs. (kgs.)	1190	540	464	215	1060	482	1058	480	1367	620
(useful lbs. (kgs.)	551	250	308	140	705	320	462	210	750	340
Motor ... ... h.p.	100 Argus		70 Gnome		100 Mercedes		100 Mercedes		100 Mercedes	
Speed ... m.p.h. (km.)	71	114	85	138	78	126	77	122	62	102
Number built	2									

Remarks.—

J—*continued.*

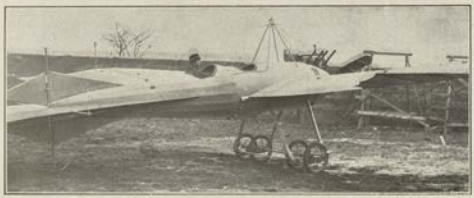
JEANNIN.

Emile Jeannin, Flugzeugbau, G. m. b. H., Stahltauben & Renneindecker Fabrik, Johannisthal b. Berlin. Capacity: small.

	1912. "Taube" monoplane.		1913. Racing monoplane.	
Length ... ... feet (m.)	29½	9	...	
Span ... ... feet (m.)	42½	13	...	
Area ... ... sq. feet (m².)	...		...	
Weight ... (total ... lbs. (kgs.)	...		..	
(useful lbs. (kgs.)	...		...	
Motor ... ... h.p.	100-150 Argus		150 Argus	
Speed ... ... m.p.h. (km.)	68	110	87	140
Endurance ... ... hrs.	5–8		4–7	
Number built	2		3	

K

KONDOR. Kondor Flugzeugwerke G. m. b. H., Essen, Ruhr. Fabrik auf dem Flugplatz, Rotthausen. Capacity: 30 or 40 a year.



1913 model. (1912 same appearance.)

	1912.	1913.	1914.
Length ... ... feet (m.)	33¾ 10·30	27 8·20	...
Span ... ... feet (m.)	48¾ 14·80	46 14	...
Area ... ... sq. feet (m².)	258 24	280 26	...
Weight ... total ... lbs. (kgs.)	1543 700	1328 600	...
useful lbs. (kgs.)	...	...	...
Motor ... ... h.p.	100 Argus	100 Argus	100 Mercedes
Speed ... m.p.h. (km.)	65 105	70* 112	...
Number built during 1912 ...	2	...	10

Remarks.—Planes dart **V** form. Constructor: J. Suwelack.

L

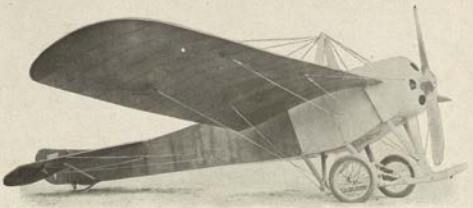
LOH. August Loh Söhne A.G. Wilhelmstrasse 22, Berlin, S.W. 48.

Model and date.	"Bombard" biplane. 1914.
Length ... ... feet (m.)	27½ 8·5
Span ... ... feet (m.)	32¼ 10
Area ... ... sq. feet (m².)	312 29
Weight ... total...lbs. (kgs.)	1168 530
useful lbs. (kgs.)	... ...
Motor ... ... h.p.	100 Rapp
Speed ... max. m.p.h. (km.)	70 112
Number built during 1913 ...	*building.*

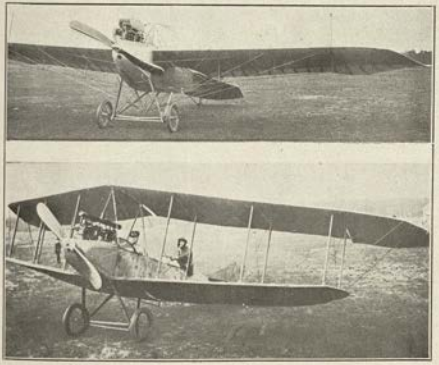
L—*continued.*

L.V.G. Luft-Fahrzeug-Gesellschaft m. b. H. Abteilung Flugzeugbau, Kleiststr. 8 Berlin W. 62.
Fabriken: Bitterfeld und Adlershof b/Berlin.

	Steel monoplane. "Roland" Military typ. 1914.		Steel biplane. "Roland" Military. 1914.		L. V. G. biplane.		L. V. G. monoplane.
Length ... ... feet (m.)	29½	*9*	26½	*8*	31½	*9·5*	
Span ... ... feet (m.)	47	*14·3*	42½	*13*	{ 46 39½	*14* *12*	
Area ... ... sq. feet (m²)	344	*32*	451	*42*	474	*44*	
Weight { machine ...lbs. (kgs.)	1389	*630*	1389	*630*	...	...	
{ load ...lbs. (kgs.)	661	*300*	1102	*500*	440	*200*	*No data.*
	882	*400*	1328	*600*	...	...	
Motor ... ... h.p.	100 Mercedes		100 Mercedes		100 Mercedes		*See photo.*
Speed ... ... m.p.h. (km.)	70-72	*105-110*	59-62	*95-100*	65	*105*	
Number built during 1912 ...	5		5		20		



L.V.G. monoplane.



"Roland" Military monoplane.

"Roland" Military biplane.

L.V.G. biplane.

MARS. (See "*D.F.W.*")

O

OERTZ. Ceased to build.

OTTO. Gustav Otto, Flugmaschinenwerke, Schleissheimer Str. 135, Munich. Started building in 1911. Present max. capacity about 50 machines a year.

	M 1912. Biplane.	
Length ... ... feet (m.)	...	32 *10·50*
Span ... ... feet (m.)	...	55½ *17·80* / 29½ *9·50*
Area ... ... sq. feet (m²)	...	431 *40*
Weight ... total ...lbs. (kgs.)	...	...
Weight ... useful ...lbs. (kgs.)	...	...
Motor ... ... h.p.	100 Mercedes	100 Mercedes or Argus
Speed ... max. m.p.h. (km.)	60 *110*	60 *110*
Speed ... min. m.p.h. (km.)	...	...
Endurance ... ... hrs.	6—8	6
Number built during 1913 ...	6	30

Remarks.—All 1912 machines purchased for German Army.

P

PEGA-EMICH. Ceased to build.

PIPPART-NOLL. Pippart-Noll-Flugzeugbau, Mannheim.

Type.	P. N. 1. Sporting. 1912.	P. N. 2. "Oberland" 1912.	P. N. 3. Military. 1913.
Length ... ... feet (m.)	31 *9·50*	28 *8·50*	28 *8·50* also 7
Span ... ... feet (m.)	34½ *10·50*	39½ *12*	45 *13·70*
Area ... ... sq. feet (m²)	215 *20*	280 *26*	300 *28*
Weight machine, lbs. (kgs.)	617 *280*	838 *380*	1234 *560*
Weight useful ... lbs. (kgs.)	330 *150*	463 *210*	441 *200*
Motor ... ... h.p.	70 Argus	70 Argus	70 Argus
Speed max. m.p.h. (km.)	59 *95*	62 *100*	68 *110*
Speed min. m.p.h. (km.)	...	...	50 *80*
Endurance ... ... hrs.	...	...	...
Number built during 1912 ...	1	1	1

R

RUMPLER. E. Rumpler, Luftfahrzeugbau G. m. b. H., Siegfriedstrasse 202, Berlin-Lichtenberg, also Johannisthal b. Berlin. Established 1909 by E. Rumpler and R. Haessner for the construction in Germany of *Etrich* monoplanes. These now vary considerably from the original *Etrich*. Capacity at present about 200 machines a year. Standard models are as follows:—

1914 Military Mono.

	Monoplane 3 C 1913	Military Monoplane 4 C 1914	Sea Monoplane 3 F 1913	Biplane 4 F 1914	Flying Boat 4 E 1914	Sea Biplane 1914
Length ... ...feet (m.)	34½ *10·5*	27½ *8·3*	34½ *10·5*	27½ *8·3*	29½ *8·97*	34½ *10·0*
Span ... ...feet (m.)	46 *14*	46 *14*	46 *14*	42½ *13*	51½ *15·7*	47½ *14·5*
Area ... sq. feet (m²,)	366 *34*	301 *28*	366 *34*	431 *340*	544 *52*	516 *48*
Weight (total lbs. (kgs.)	1433 *650*	1323 *600*	1587 *720*	1499 *680*	1719 *780*	1763 *800*
Weight (useful lbs. (kgs.)	441 *200*	441 *200*	441 *200*	441 200	441 *200*	441 *200*
Motor ... ... h.p.	100 Daimler	100 Daimler	100 Daimler	100 Daimler	100 Austro-Daimler	150 Henz
Speed ... m.p.h. (km.)	62 *100*	75 *120*	62 *100*	62 *100*	56 *90*	81 *130*
Number built						

Flying Boat.

RUTH-ROHDE. Ceased to construct.

S

SCHELIES. Ceased to construct.

SCHWADE. Schwade, Erfurt. Established, 1914.

Model and date.	1913. Steel biplane.
Length ... ...feet (m.)	... ...
Span ... ... feet (m.)	59 *18* / 29½ *9*
Area ... ... sq. feet (m².)	490 *46*
Weight ... total ...lbs. (kgs.)	1014 *460*
Weight ... useful...lbs. (kgs.)	1212 *550*
Motor ... ... h.p.	80/100 Schwade Rotary
Speed ... max. m.p.h. (km.)	62 *100*
Speed ... min. m.p.h. (km.)	
Endurance ... ... hrs.	5
Number built in 1912	...

SCHULZE. Gustav Schulze, Flugzeug Werke, Burg b. Magdeburg. Schulze began to build in 1910 light monoplanes, generally along *Santos-Dumont* lines. Maximum present capacity about 12 machines a year.

	1912. I.	1912. II.	1912. III (2-seater).	1913. I (2-seater).
Length ... ... feet (m.)	19½ *6*	26¼ *8*	21½ *6·50*	23 *7*
Span ... ... feet (m.)	26½ *8*	34½ *10·50*	28 *8·50*	29½ *9*
Area ... sq. feet (m².)	172 *16*	215 *20*	172 *16*	194 *18*
Weight ... total ... lbs. (kgs.)	330 *150*	441 *200*	441 *200*	551 *250*
Weight ... useful ... lbs. (kgs.)	...	...	...	...
Motor ... ... h.p.	24-30 Hilz	24-30 Hilz	35 Haacke	35 Haacke
Speed ... max. m.p.h. (km.)	48 *77*	53 *85*	56 *90*	53 *85*
Speed ... min. m.p.h. (km.)	...	43 *70*	50 *80*	*46 75*
Number built	1	3	1	10

S—*continued.*

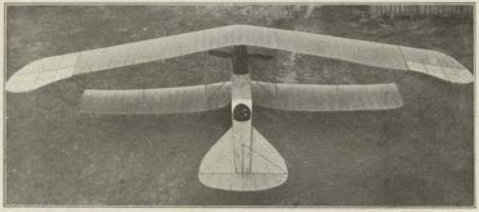
SIGISMUND. Prinz Sigismund von Preussen, Berlin.

Model and date.	Monoplane.	"Bulldogge." **1913.**
Length ... ... feet (m.)	29½ *9*	...
Span ... ... feet (m.)	42¾ *13*	...
Area ... ... sq. feet (m^2.)	323 *30*	...
Weight ... total, lbs. (kgs.)	950 *430*	...
Weight ... useful, lbs. (kgs.)	395 *180*	...
Motor	Argus, 100	100 Mercedes
Speed ... max. m.p.h. (km.)	56 *90*	78 *125*
Number built	2	6

SOMMER. (See "*Deutsche Sommer.*")

U

UNION FLUGZEUGWERKE. Union Flugzeugwerke G.m.b. H. Elsenstrasse 106 & 107, Berlin s. o. 36. Established 1913. Capital 500,000 marks. Capacity of works: 30 machines a year.



Model and date.	Land machine.		Hydro.	
Length ... ... feet (m.)	24¼	7·3	27½	8·5
Span ... ... feet (m.)	{36 / 33	11 / 10	47½ / 44½	14·5 / 13·5
Area ... ...sq. feet (m².)	376	35	495	46
Weight ... {total ...lbs. (kgs.) / useful, lbs. (kgs.)	1212 / 882	550 / 400	1543 / 661	700 / 300
Motor	Various		Various	
Speed ... ... m.p.h. (km.)	78	125	62	100
Endurance ... ... hrs.	5		...	
Number built	6		2	

W

WESTPHAL. Paul Westphal, Berlin-Johannisthal. Capacity: small.

Model and date.	"Taube" type monoplane. 1914.	
Length ... ... feet (m.)	31½	9½
Span... ... ... feet (m.)	43	13½
Area... ... sq. feet (m².)	...	
Weight {total ... lbs. (kgs.)	1433	650
Weight {useful, lbs. (kgs.)	661	300
Motor ... ...h.p.	...	
Speed ... m.p.h. (k.m.)	75	120
Endurance ... ... hrs.	...	
Number built	2	

WRIGHT. No longer built in Germany.

Z

ZIEGLER. Ceased to construct.

TABLE OF ALL EXISTING

GERMAN DIRIGIBLES.

(Approximately 1000 m³ = 35,000 c. feet.)

Military.

Date.	Name.	Make.	Type.	Capacity in m³.	Total H.P.	Speed. m.p.h.	(km.)	Remarks
1908	**Z I**	Zeppelin 3b	r.	12100	190	29	46	as *rebuilt*
1910	**Z II**	Zeppelin 9b	r.	18000	345	35	56	as *rebuilt*
,,	**L. S I**	Schütte Lanz 1	r.	20000	540	40	62	
1912	**Z III**	Zeppelin 12	r.	17800	450	49	79	was *Schwaben L. Z 10*
1913	**Z IV** (*Z I Ersatz*)	Zeppelin 15	r.	21000	450	48	77½	4 guns
,,	**Z I** (*Z Ersatz 21*)	L. Z 19	r.	19500	540	48	78	
,,	**Z V**	L. Z 20	r.	19500	540	50	80	
,,	**Z VI**	L. Z 21	r.	19500	540	48	78	
1914	**Z VII**	L. Z 22	r.	23000	540	48	78	
,,	**Z VIII**	L. Z 23	r.	23000	540	51	82	*Building*
,,	**L 3**	L. Z 24	r.	23000	540	53	85	Navy
,,	**S. L 2**	Schütte Lanz 2	r.	24000	550	53	85	Navy. 5 gondolas
,,	**L 4**	Schütte Lanz 3	r.	30000	900	59	95	Navy. *Building*
1915	6 *building*							
1908	**P I**	Parseval 2	n.r.	3800	85	33½	54	
1911	**P III**	Parseval 11	n.r.	11000	400	42½	67	
1913	**M IV**	Gross-Bas 5	s.r	12000	400	44½	70	old 1908 *rebuilt*
,,	**P II** *Ersatz*	Parseval 8	n.r.	8250	300	41	66	
,,	**P IV**	Parseval 16	n.r.	10000	360	45	72	
1914	**P V**	Parseval 23	n.r.	12000	400	48	78	*Building*

Private.*

Date.	Name.	Make.	Type.	Capacity in m³.	Total H.P.	Speed. m.p.h.	(km.)	Remarks.
1910	**DEUTCHLAND 2**	Zeppelin 6a	r.	15000	345	36	58	Deutschland *Ersatz* Delag
1912	**Y. LUISE**	Zeppelin 11	r.	17000	450	40	62	Delag
,,	**HANSA**	Zeppelin 13	r.	17000	450	40	62	Delag
1913	**SACHSEN**	Zeppelin 17	r.	21000		48	77½	Delag
1914	*Nothing built.*							
1910	**STOLLWERCK**	Parseval 6	n.r.	9000	220	31	50	
1911	**P. L 9**	Parseval 9	n.r.	2200	50	25	40	Sporting (†)
1912	**P. L XII**	Parseval 12	n.r.	8800	220	33½	54	
1913	**P. L 10**	Parseval 10	n.r.	2200	50	25	40	*Building*: delayed

(†) P.L 9 reported sold to Turkey, April, 1913. (*) Three other dirigibles, *Unger*, *Veek*, and *Siemens-Schuckert*, are generally credited to Germany. Of these *Unger* is merely a project, *Veek* has been talked about for four years, but has never reached completion. *Siemens-S.* has ceased to exist.

GERMAN DIRIGIBLES.

Dirigible Sheds.

(See Note.)

Bickendorf bei Köln.
Biesdorf bei Berlin.
*Bitterfeld (*Parseval Co.*) (2 sheds).
Braunschweig.
Cuxhaven.
Dresden (*2 building*).
Düsseldorf (*Delag*)
Frankfurt a/m.
Friedrichshafen (*Zeppelin Co.*)
Fuhlsbüttel.
Germersheim, Bayern.
Gotha.
Hamburg (*Delag*).
*Johannisthal (*L.V.G.*) (2 sheds).
Kiel (*private*).
Köln.
Königsberg i/Pr.
Leichlingen.
Leipzig.
Liegnitz.
Manzell (*Zeppelin Co.*)
Metz.
Oos bei Baden-Baden (*Delag*).
Posen.
Potsdam (*Delag*).
Reinickendorf bei Berlin. (3 sheds).
Rheinau.
Schwidernühl.
Strassburg.
Thorn.
Trier.
Wanné.

Note.—Unless otherwise stated the above are military sheds. All private ones capable of holding *Zeppelins* are subsidised.
*=not large enough for *Zeppelins*.

Dirigible Pilots.

For M. dirigibles.

Geerdts, Oblt.
Georgè, Hptm.
v. Jena, Hptm.
Kirchner, Oberltn.
Lohmuller, Hptm.
Masius, Oberltn.
v. Muller, Hptm.
Nichisch v. Rosenegk, Oberltn.
Schlutter, Oblt.
Sperling, Major.
von Zech, Oblt.

Dirigible Pilots.

z = Zeppelin. s = Schutte-Lanz.
p = Parseval *pilot*.
(The number after each name is the Imperial Ae. C. certificate number.)

z Abercron, H. v. Major (1)
z Ackermann, Lt. (38)
z Andri Haupt. (42)
z Bassaz, K. v. (28)
z Bentheim, Kapt. Lt. a. D. v. (34)
z Blew (25)
Clouth, R. (8)
p Dinglinger, F. (2)
z Dorr, W. E. (21)
z Durr (9)
z Eckener, Dr. (10)
p Forsbeck, Ob. Lt. A. D. (11)
z Glund, F. (23)
z Hacker, (12)
p Hackstetter, Reg. B. a. D. (13)
z Hanne, G. (32)
z Heinen, A. (22)
z Holzmann, Ob. Lt. A. (26)
s Honold, R. (29)
p Hornei, Kap. Lt. (14)
p Jordens, W. (19)
p Kehler, R. v. (6)
p Kiefer, T. (5)
Kleist, Hptm. a. D. v. (15)
p. z Krogh, Hptm. a. D. v. (16)
z Lange, K. (30)
z Lau (17)
z Lehmann (40)
z Lemperts, E. (33)
z Mechlenburg, W. C. (35)
z Meyer, Ob. Lt. E. (27)
p Parseval, A. v. (4)
z Probst (37)
p Rostzoll (36)
p Santichi (41)
p Simon (39)
z Schoof (43)
z Stahl, K. (31)
p Stelling, A. (3)
z Sticker, J. (24)
p Thewaldt, C. H. (20)
z Zeppelin, Graf. v. (7)
z Zeppelin, Graf. F. v. junr. (18)

GERMAN MILITARY CLASS—GROSS-BASENACH. (Semi-rigid)

Up to date, these vessels have been designed by Major Gross and Oberingenieur Basenach.

The utmost secrecy is observed as to their details.

The system of employing 2 ballonets has been borrowed from the *Parseval* type, and presumably the *Parseval* system of working the automatic valves has also been adopted.

In all other features, these ships appear to resemble the French *Lebaudy* type, the shape of the hulls being rather better.

List of ships built, and re-built of this type:—

1	...	...	= **Aeronautical Society.**	...	(1,800 m³)	all gone.
2	(reconstructed)	= **M 1, Military.**		...	(6,000 m³)	
3	,,	= **M 2**	,,	...	(6,000 m³)	
4	,,	= **M 3**	,,	...	(9,000 m³)	
5	,,	= **M 4**	,,	...	(12,000 m³)	

[See next page.

M IV (re-built 1913). ***Military.***

Maximum length. 334 feet (102 m.) **maximum diameter.** 44 feet (13·5 m.) **volume.** 423,800 c. feet (12,000 m³.)

Total lift.— lbs. (kgs.) **Useful lift,** lbs. (kgs.)

Gas bags.—Continental.

Motors.—2 Körting, 100 h.p. each = total 200 h.p.

Speed.—44 m.p.h. (70 k.p.h.)

Propellers.—4 (two for each motor.) Carried on outriggers projecting from the car.

Remarks.—Departs from previous practice in having two separate cars, each of which contains one motor. Originally built in 1911 of 7,500 m³. Re-built 1912-1913 to details as above.

PARSEVAL CLASS (Non-rigid).

Luftfahrzeug-Gesellschaft m.b.H, Berlin, W. 62.

When the "Motorluftschiff Studien Gesellschaft" was formed at the instigation of the German Emperor, a committee was formed to acquire an experimental airship of the most promising type. Major Von Parseval's first airship was selected, and since that time the above company has confined itself to improving this type, and to making exhaustive and costly researches, all of which have been embodied in successive ships.

The characteristic feature of every one of these craft is its unequalled portability. Almost all other so-called Non-rigid vessels distribute the load by means of a long girder which also serves as a car. This girder is awkward to pack up and transport. Parseval uses a comparatively small car, and distributes the weight by hanging it further below the balloon than usual, and also by using 2 ballonets which are placed one near each end of the gas bag.

These 2 ballonets enable the ship to be trimmed by merely pumping air into either at the expense of the other.

Another essential feature of the type is the system by which the valves are worked automatically. At the present time there is no other system of valve working so reliable as this.

A third essential feature of the class is the use of a swinging car, in such a manner that pitching, due to alterations of propeller thrust, is automatically checked by an alteration of the position of the centre of gravity.

A fourth feature is the use of limp propeller blades. A propeller of this type is very easily packed up.

The shape of these vessels is in accordance with the experiments of Professor Prandtl.

Ships of this class built or building (figures supplied by the Parseval Co.):—

EXPERIMENTAL PARSEVAL	... ...	2,300 m³.
P. L. 1	... ***Kais. Ae. C.***	3,200 m³.
MILITARY P I	... ...	4,000 m³.
MILITARY P II	... ...	6,600 m³.
P. L. 4	... ***Austrian Military*** ...	2,300 m³.
P. L. 5	...***Luftverkehrs Gesellschaft***	1,450 m³.
P. L. 6	" "	9,000 m³.
P. L. 7	... ***Russian Army***	7,600 m³.
P. L. 8	... ***MILITARY P II Ersatz*** ...	8,250 m³.
P. L. 9	... (Gone)	2,200 m³.
P. L. 10	... ***Motorluftschiff Studien Gesellschaft***	1,700 m³.
MILITARY P III	... ...	10,000 m³.
P. L. 12	... (Gone)	8,800 m³.
P. L. 13	... ***Japanese Army***	8,500 m³

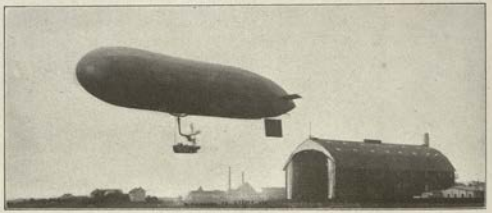
Ships of the Parseval class continued from previous page:—

P. L. 14	***Russian Army***	10,000 m³.
P. L. 15	***Italian Army***	10,000 m³.
P. L. 16	***MILITARY P IV, Prussian Army***	10,000 m³.
P. L. 17	***Italian Army***	10,000 m³.
P. L. 18	***British Navy***	8,800 m³.
P. L. 19		10,000 m³.
P. L. 20	***British Navy***	10,000 m³.
P. L. 21		10,000 m³.

(Of the above, the Experimental is no longer in existence, *P. 2* is out of service, and *P. L. 5* has been burned and destroyed, *P.L. 9* & *12* also out of service.

PARSEVAL (P.L. I). (1908.) (Belongs to the Kaiserl. Aero Club.)

(Parseval class.)



Length. 197 feet / 60 m. **max. diam.** 31 feet / 9·4 m. **capacity.** 115,000 c. feet / 3,200 m³. **lifting power.** 7,800 lbs. / 3,583 kgs.

Gas bag.—Cylindrical, with semi-conical front. Of rubber-proofed material in longitudinal strips. Pressure in ballonets and gas bag, 30 mm. of water.

Motor.—One 85 h.p. Daimler.

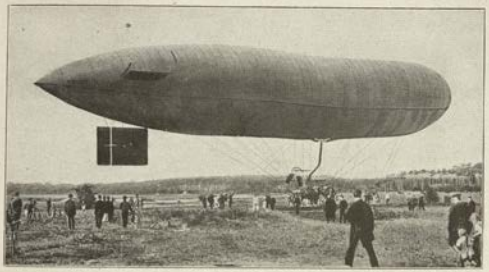
Fuel.—700 lbs. / 88 gallons / 325 kg. / 400 litres

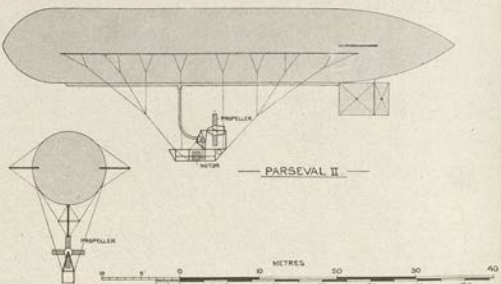
Speed.—20 m.p.h. (32 k.p.h.)

Propeller.—One 4-bladed. Semi-rigid Parseval.

This vessel was somewhat altered on being bought by the Society. Her essential principle is that she can be taken to pieces in a few minutes, and carried in a truck. Her main feature is that she has a ballonet at each end. This is described in the case of type A (*P.L. 2*). This class rise with the forward ballonet empty, and inclined up by the bow. The propeller is similar to that of *P.L. 2*. The car also is mounted on wire runners. She was originally 4,000 m³. capacity. Built 1908. Station: Bitterfeld. The car is at present in Deutsches Museum, Munich.

PARSEVAL P.L. 2—P. I. Military. (1908.)





Built by the "Society for the Study of Motor Air Ships," and taken over by the German War Office.

Length. 197 feet ; **maximum diameter,** 34 feet ; **capacity.** 141,259 cubic feet ; **lifting power.** 9,280 lbs. ; 60 m. ; 10·40 m. ; 4,000 cubic m. ; 4,180 kgs.

Gas bag.—Front end semi-ellipsoidal with semi-axes 15·4 feet ; and 11·8 feet, ; from which it increases to its maximum diameter 47 m. ; 3·6 m. ; This is maintained for about two-thirds of its length, when it begins to taper to a point at the stern. Made of 2 layers of transverse strips of rubber proofed material, crossing each other diagonally. Fitted with a tearing strip.

Ballonets.—One at each end, together amounting to about one-quarter of the total capacity. Owing to this disposition, the trim can be altered, and steering effected in the vertical plane by filling either more than the other. Pressure in the ballonets and gas bag, 20 mm. of water pressure.

Motor.—4-cylinder 85 h.p. Daimler placed at one side of the car to give more room. 1,000 to 1,200 r.p.m.

Propellers.—12½ feet ; diameter. 250 to 300 r.p.m. 4-bladed, the blades being of peculiar construction. When stopped, the fabric 3·75 m. ; of which they are made hangs down limply ; when running, these flaps fly out under centrifugal force

Speed.—37 miles per hour. 45 kilometers per hour.

Car.—**Length,** 22½ feet ; Width 14 feet, ; 6·8 m. ; 4·22 m. ; Made of nickel steel, U bars, screwed together so as to take the pieces rapidly. The sides are lattice girders. The whole is boat shaped and covered with canvas. Contains motor, chart table ; trail rope 480 feet ; long, weighing 220 lbs. ; 146 m. ; 100 kg. ; Wheel for horizontal steering at the bow. 110 gal. ; cask of petrol on the girders at the after point. 500 litre ; 41 feet ; below the gas bag. It is capable of swinging horizontally on wires running over rollers 12½ m. ; Whereas without this device a forward swing of the car would lift the nose to a possibly dangerous extent, the free motion, of the car shifts the centre of the gravity forward and so preserves stability.

Steering. In vertical plane, by altering the trim. In horizontal plane, by a rudder of 80·7 sq. feet ; immediately behind the vertical plane. 7·5 ma ; Two fixed horizontal planes are placed at the rear end of the gas bag above the central line.

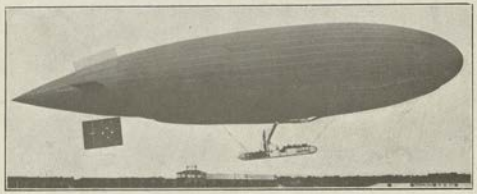
Table of weights:—

Gas bag	... ...	1,655 lbs.
Cordage	... ...	220 ,,
Trail rope	... ...	220 ,,
Car and motor	... ...	529 ,,
Fuel	... ...	176 ,,
Oil	... ...	160 ,,
Oil and fuel tanks, instruments, miscellaneous	...	1,637 ,,
Crew, passengers, ballast,	...	1,654 ,,
Total.	...	6,851 lbs.

Note.—This remarkably successful ship has performed a continuous flight of 11½ hours. She also remained at a height of 1,800 feet ; for 1 hour. She can be transported in 1 railway 1,500 m. ; truck or 2 pair horse wagons, and be assembled and filled ready for ascent within 3 hours of arrival by train.

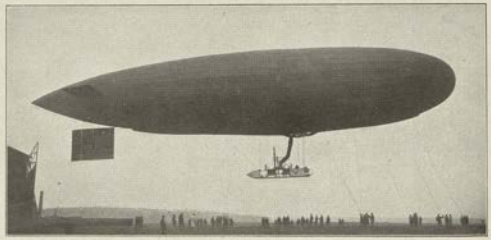
Built 1908. Station : Metz.

PARSEVAL P.L. 6. (1910.)



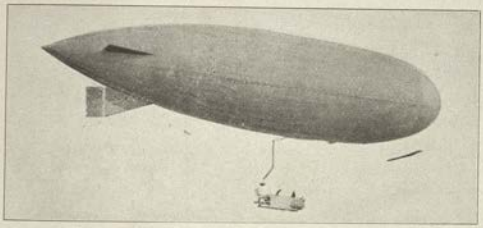
Length, 229½ feet (70 m.) **Diameter,** 49½ feet (15 m.) **Volume,** 318,000 c. feet (9,000 m³)
Gas bags.—Riedinger.
Motors.—2 N.A.G. of 110 h.p. each = 220 h.p.
Speed.—31 m.p.h. (50 k.p.h.)
Propellers.—Two 4-bladed. Semi-rigid material.
Remarks.—Station, Bitterfeld.

PARSEVAL P.L. 8. = P II. Ersatz. Military. (1913.)



Maximum length, 252¾ feet (77 m.) **maximum diameter,** 50½ feet (15·50 m.) **volume,** 290,000 c. feet (8,250 m³.)
Total lift.—5½ tons = 12,125 lbs. (5,500 kgs.)
Gas bags.—2 ballonets, usual arrangement.
Motors.—300 h.p. made up of two 150 h.p. Daimler motors, placed one behind the other.
Speed.—41 m.p.h. (66 km.)
Propellers.—2 Parseval, 4-bladed, semi-rigid steel.
Steering.—As in others.
Remarks.—Station, Cologne, (Cöln).

PARSEVAL P.L. 9 (1910), ***& 10.*** (Building 1913.)



Maximum length, 164 feet / 50 m. **maximum diameter,** 26¼ feet / 8 m. **volume,** 77,700 c. feet / 2,200 m³.

Total lift.—2,910 lbs. (1,320 kgs.)

Gas bag.—Continental fabric. One central ballonet instead of the usual two.

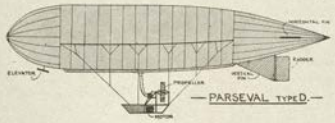
Motors.—1 N.A.G. of 50 h.p.

Speed.—25 m.p.h. (40 k.p.h.)

Propellers.—One 2-bladed, wooden. Diameter, 9¾ feet (3 m.)

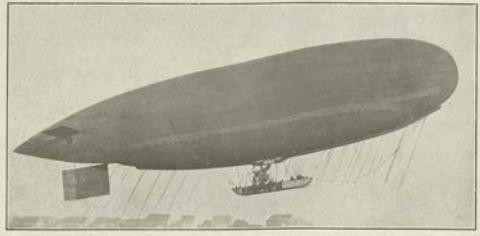
Steering.—Differs from other standard types, in that only one ballonet being fitted, an elevator is introduced under the bow.

Remarks.—Small ships for sporting purposes. A remarkably successful type of small dirigible. A small *P.L. 5*, burned 1912. *P.L. 10* delayed owing to press of other work.



Uniform Dirigible Scale.

PARSEVAL P.L. 11. = P. III. Military. (1911.)



Maximum length, 272½ feet / 83 m. **maximum diameter,** 53 feet / 16·20 m. **volume,** 388,450 c. feet / 11,000 m³.

Total lift.

Gas bags.

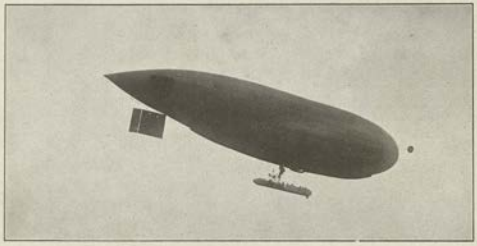
Motors.—2 Körting, each of 200 h.p. = 400 total.

Speed.—42 m.p.h. (67 k.p.h.) (18·3 metres p. sec.)

Propellers.—Two 4-bladed Parseval.

Remarks.—Built 1911. Station, Koenigsberg.

PARSEVAL P.L. 12. "Charlotte." (1912.)



Maximum length, 259 feet / 79 m. | **maximum diameter,** 49½ feet / 15·20 m. | **volume,** 300,750 c. feet / 8,800 m³.

Total lift.

Gas bags.

Motors.—2 N.A.G. of 110 h.p. each = 220 total.

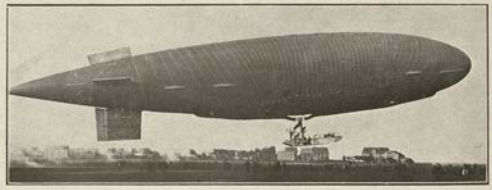
Speed.—33½ m.p.h. = 54 k.p.h. (15 m. per sec.)

Propellers.—2 Parseval.

Steering.—Usual.

Remarks.—Built 1911. Station: Wanne.

PARSEVAL P.L. 16—P. IV. Military. (1913.)



Maximum length, 308½ feet / 94 m. | **maximum diameter,** 51½ feet / 15·50 m. | **volume,** 353,000 c. feet / 10,000 m³.

Gas bags.—Metaler.

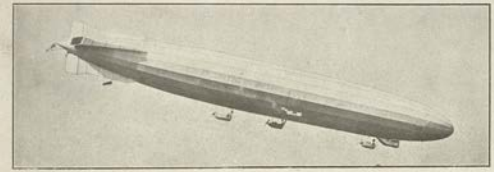
Motors.—2 Maybach, of 180 each = 360 h.p.

Speed.—45 m.p.h. = 72 k.p.h. (20 m. per sec.)

Propellers.—Two 4-bladed, wooden (on trial).

Remarks.—For the Prussian Army. Station: Berlin.

SCHÜTTE-LANZ 2. Military. S.L. II. (1913.) H. Heinrich Lanz, Rheinau bei Mannheim.



Maximum length, feet / m. **maximum diameter,** feet / m. **volume,** 918,000 c. feet / 26,000 m³.

Total lift.—

Gas bags.—These are of great strength and of unusual shapes, made to fit the interior, which is encumbered with cross stays. All but two of the bags are always full, and when the gas expands it flows into the remaining two, which are nearly empty at sea level, and full at 6500 feet (2,000 m.) A centrifugal pump is used for distributing the gas.

Motors.—2 Maybach of 270 h.p. each.

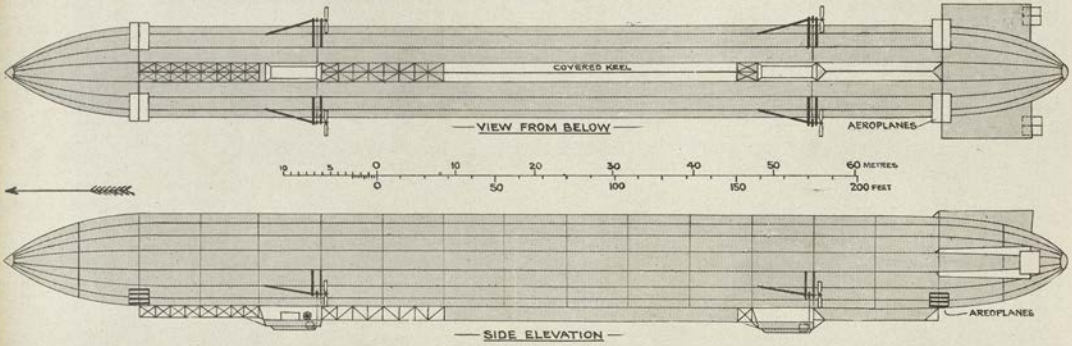
Propellers.—

Steering.—

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

ZEPPELIN type. Rigid. Graf von Zeppelin, Friedrichshafen.

The features of this type are :—A rigid framework of aluminium, a number of drum-shaped gas bags, and a thin outer cover.



At the end of March, 1913, the total of *Zeppelins*, limit and building was 16, including one (number 18) for Austria. Of these several had come to grief in various ways, and the actual total at the date mentioned, was :—

8 effective—4 Army (of which one *Z I* was still on trials), 1 naval and 3 private.

3 completing or building—1 naval, 1 private and 1 for Austria.

Others projected but not actually in hand.

All are on the lines of the above plan, differing only in minor details, such as the provision of a cabin amidships, etc., and in dimensions.

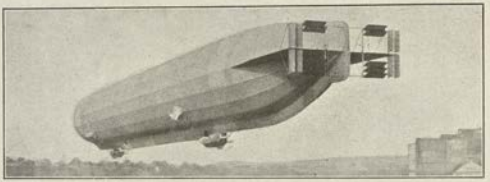
Details see the following pages.

ZEPPELIN.—(*continued*).

Name / Zeppelin No. / Date / Service	Z II. 9b. 1911. Army.	VICT. LUISE. 11. 1912. "Delag."	Z III. (ex Schwaben). 12. 1912. Army.	HANSA. 13. 1912. "Delag."	(Ersatz Z I.) Z IV. 15. 1913. Army.	SACHSEN. 17. 1913. "Delag."	Z I. 19. 1913. Army.	Z V. 20. 1913. Army.	Z VI. 21. 1913. Army.	Z VII. 22. 1914. Army.	Z VIII. 23. 1914. Army.	L 3. 24. 1914. Navy.	Z IX-XI 25-27. 1914-15. Army.	L 5 & 6. 28-29. 1914-1915. Navy.
Volume (c. feet)	635,000	667,000	618,250	660,000	680,000	742,000	689,000	689,000	689,000	717,000	717,000	717,000	*building*	*building*
Volume (m³)	**18,000**	**18,700**	**17,500**	**18,700**	**19,500**	**21,000**	**19,500**	**19,500**	**19,500**	**23,000**	**23,000**	**23,000**		
Length feet (m.)	450 *140*	485½ *148*	463 *141*	485½ *148*	492 *150*	492 *150*	461 *141*	461 *141*	461 *141*	485½ *148*	485½ *148*	...	...	...
Diameter ... feet (m.)	46 *14*	46 *14*	46 *14*	46 *14*	47½ *14·5*	47½ *14·5*	*14·8*	*14·5*	*14·8*	*16*	...	...	...	...
Envelope		...	...	...	...	...	...	...	...	...	...	...	...	...
Gas Bags fabric	...	...	Continental	...	...	...	...	...	...	...	...	...	...	...
Gas Bags number	16	18	16	18	18	...	16	16	16	18	18	18	20	23
Lift total ..... tons	17	19	17	19	19	21	...	...	...	...	...	...	...	...
Lift useful ... tons	4½	...	4½	...	...	...	...	...	...	...	...	...	...	...
Motors ... h.p.	3—120 Maybach (= 360)	3—150 Maybach (= 450)	3—150 Maybach (= 450)	3—150 Maybach (= 450)	3 Maybach (= 540)	3 Maybach (= 450)	3 Maybay (= 450)	3 Maybay (= 540)	3 Maybay (= 540)	3 Maybay (= 540)	3 Maybay (= 540)	4 Maybay (= 650)	4 Maybay (= 800)	4 Maybay (= 800)
Propellers number	4	4	4	4	4	...	4	...	...	...	...	...	...	...
Propellers blades	2	2	2	...	2 forward, 4 aft	...	...	...	...	...	...	...	...	...
Propellers diam. feet (m.)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Max. Speed m.p.h. (km.)	35 *56*	40 *62*	45 *72*	49 *78*	48 *77*	48 *77*	42 *78*	50 *80*	49 *78*	49 *78*	51 *82*	53 *85*	56 *90*	60 *95*
Full speed endurance hrs.	20	40	25	40	...	...	36	36	36	48	48	72	100	120
Complement	...	18 crew, 25 passeng'rs	...	...	...	...	...	...	...	...	...	...	...	...
Station	Cologne	*varies*	Cologne	*varies*	...	Leipzig *or elsewhere*	Metz	Posen	Gotha	Dresden	...	Hamburg	...	...

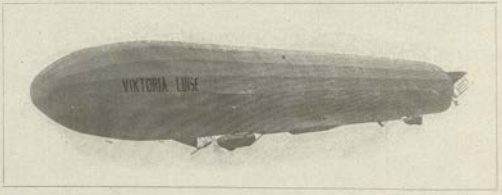
Z I. (*2 Ersatz*). ***Military.*** (1913.)

Lift, 19 } **Volume,** 19,500 m³. } **Length,** 462½ feet } **Diameter,** 48½ feet } **Speed,** 78 k.p.h. }
} 680,000 c.f. } 141 m. } 148 m. } }
Motors, 540 P.S.

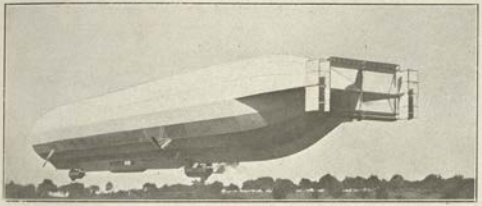


Z II. Military. (1911.)

Volume, 17,800 m³. } **Length,** 485½ feet } **Diameter,** 46 feet } **Speed,** 76 k.p.h. } **Motors,** 3 Maybay 450 P.S.
629,000 c. f. } 148 m. } 14 m. } }



VIKTORIA LUISE. (*Private.*) (1912).



Z III. Military. (1912.)

Volume, 17,500 m³. (618,250 c.f.) | **Length,** 463 feet (141 m.) | **Breadth,** 46 feet (14 m.) | **Max. Speed,** 45 m.p.h. (72 k.p.h.)

HANSA. *(Private).* (1912.)

Volume, 18,700 m³. (660,000 c.f.) | **Length,** 485¼ feet (148 m.) | **Breadth,** 46 feet (14 m.) | **Max. Speed,** 50 m.p.h. (78 k.p.h.)

Photo, Delius.

Z IV. Military. (1913). Armament: 1 gun on top, 1 in each gondola, 1 can be lowered from central cabin.

Volume, 19,500 m³. (689,003 c.f.) | **Length,** 462¼ feet (141 m.) | **Breadth,** 48¼ feet (14·80 m.) | **Max. Speed,** 48 m.p.h. (77 k.p.h.)

GREEK.

Aerial Societies:—

None.

Aerial Journals:—

None.

Military Aeroplanes:—

At end of March, 1913, these included:—1 *Astra* hydro. (fitted with Scott's bomb dropper), 2 or 3 *Nieuports*, 1—100 h.p. *M. Farman*, and probably some others. Owing to the war, details are unobtainable. 3 *Bleriots* reported captured from the Turks, and 15 *Farmans* on order.

Military Aviators:—

Adamis (824 Ae. C. F.)
Kamberos (744 Ae. C. F.)
Montoussis (839 Ae. C. F.)
Mutassas, Sub-lt., naval.
Savoff, Lt.

Flying Grounds:—

Phaleron.

Killed 1913

Argyropulus, Lt.

ITALIAN.

Aerial Societies:—

Ae. C. d'Italia (Ae.C.I.), 62 via Colonna, Rome.
Ae. Club di Roma (Ae.C.I.), 183, via del Triton, Rome.
Circolo, Aeronautico Napoletano, 295 v. Roma, Naples.
Lega Aerea Nazionale (L.A.N.), 6 via della Signora, Milan.
Societa Aeronautica-Italiana (S.A.I.), 4 via Boccaccio, Milan.
" " " 6, via Cernaia, Turin.
Societa Aviazone, di Torino (S.A.T.), 28 via Roma, Turin.
Societa Ital. di Aviazone, (S.I.A.), 14 v. Monte Napoleone, Milan.

Aerial Journals:—

(3 times a week.)

Gazzetta dello Sport, 15 v. della Signora, Milan. L—·05 (= ½d.)

(Weekly):

Italia Sportiva, Rome. L—·05 per no. (= ½d.)
Lettura Sportiva, 17 corso Porta Romana, Milan. L—·10 (= 1d.)
Sporta (Gli). 46 and dei Prefretti, Rome. L—·05 (= ½d.)
Stampa Sportiva, 3 v. Davide Bertolotti, Turin. L—·10 (= 1d.)
Tribuna Sport, 22 via S. Giacomo, Naples. L—·10 (= 1d.)

(Monthly):

Rivista della L.A.N. (Lega Aerea Nazionale), Milan.
Rivista del T.C.I. (Touring Club Italiano), 14 v. Monte Napoleone, Milan. L—·40 (= 4d.)
La Navigazione Aerea (Bolletino dell' Ae. C. d'Italia). L—1·80 (= 1/6.)

(Annual):

Annuario dell' Aeronautica (Touring Club Italiano), 14 v. Monte Napoleone, Milan. L—6·00 (= 5/-)

Flying Grounds (Military see next page):—

Cameri, Novara.—15 hangars (Thouvenot school).
Mirafiore, Turin.—17 hangars (Asteris and Chiribiri schools).
S. Giusto, Pisa.—4 hangars (Antoni school).
Taliedo, Milan.—26 hangars.
Vizzola Ticino.—7 hangars (Caproni school).

Dirigible Headquarters (with hangars, etc., etc.):—

Bracciano.
Milan.
Rome.
Venice.
Verona.

ITALIAN MILITARY AVIATION.

ORGANISATION, etc.

The *Battaglione Aviatori* has its headquarters at Turin. In July, 1912, it was re-organised along the following lines:—

1 command at Turin.
1 flying work.
1 technical work.
2 troop duty.
6 at the aviation schools, with a certain number of mobile squadrilles.

The recognised grades are:—

a.a.p. aspirante allievo (learners).
a.p. allievo pilota (certificated pilots).
p. pilota militare (superior military brevet).

In flying work the superior pilots are mostly using *Bleriots*; the ordinary pilots *Blériot-Caproni*, *Bristol*, *Antonix*, *Deperdussins* and *Vaisins*.

The technical section chiefly supervises the theoretical instruction of the *a.a.p.*

The 2 companies on troop duty practical work, preparation for the schools.

FLYING SCHOOLS.

The military schools are:—

Aviano.—Central school. Size about 5 × 2 kilometres. Sheltered from all winds except westerly, by banks of trees. Numerous hangers.

Miraflori (Turin).—Mixed military and civil school. Hangers. School machines confined to *Asterix*, *Blériot*, *Nieuport* and *Savary* types.

Pordenone.—School for superior brevets. Treeless plain. Principal school machines *Breguets* and *Farmans*; but some *Blériots* and *Caproni*.

S. Francesco al Campo.—*M. Farmans* machines. At present for officers trained in France.

Somma Lombarda.—Camp school for *Nieuports*.

Venaria Reale.—Formed late in 1912. *Bristol* monos for certificated pilots.

GENERAL TRAINING.

50 officers in training during the first quarter of 1913.

Aspirants commence with instruction in the theory of heavier than air machines, resistance of material and particular instruction in the various type of aero motors in use. They are taken for flights as passengers.

All then go to the training camp about 80% for monoplane work, the remainder for biplanes.

MONOPLANES. Special attention paid to teaching *Gauchin Dessent*.

BIPLANES. Much shorter course. Principal feature: *Vol Plané*.

For the *military brevet* the examination is most comprehensive, special attention is paid to flying in wind, manœuvring, climbing, good landings without inconvenience to passengers, cross country flights, etc. The course is generally modelled on war experiences.

TOTAL FLYING STRENGTH.

No particular distinction between naval and military aviators.

Total by end of June, 1913, to be about 225 certificated aviators of whom a fair percentage hold the superior brevet. In addition all the best civilian aviators are held at disposal.

Military Aeroplanes.

At the end of 1911 there were about 20 machines, mostly *Blériots* and *Farmans*. The majority of these are still in use for school purposes.

At the end of March, 1913, the machines effective for war purposes were roughly as follows:—

Blériot.
Bristol (mono.)
Caproni.
Deperdussin.
Farman.
Henriot.
Nieuport.
Savary.

Total *about* 50, plus a number of school machines.

About 40 machines were on order, including 12 *Bristol-Caproncelli.*

Naval Aeroplanes.

Effective at end of March, 1913.

1 *Calderara.*
1 *Galdini-Farman.*
4 or 5 others.

Army Aviators.

March, 1913, to March, 1914.

Agostini, Cap. U.
Arciprete, Ing. G.
Benigni, Ten. T.
Canovetti, Ing. C.
Castagneris, Cap. G.
Fabbri, Capt.
Frassinnetti, Maggr. Cav. R.
Garotti, Ten. N. G.
Gravina, Ten. vase M.
Malingher, Cap. A.
Mina, Dott. Cap. L.
Moris, C. Com. M.
Munari, Cap. E.
Pastine, Ca. G.
Pastrovic, Ten. G. B.
Penze, Ten. de V. A.
Petrucci, Maggr. Cav. E.
Piscenza, Ing. G.
Ponzio, Ten. V. C. E.
Prato Prev. Ing. R.
Pugliesehi, Cap U.
Ranza, Cap. A.
Ricaldoni, Cap. O.
Rossi, Cap. Z. A.
Scelsi, Cap. F. cav. G.
Signorini, Cap. T.
Valli, Ten. V. G.
Verduzzio, Cap. R.
Vita, F. Cap. C.
Castagneris, Cap. G.
Cianetti, Cap. E.
Clarsetti, Cap. E.
Cobianchi, Sottoten, M.
Corceo, Cap. A.
Dal Fabbro, Maggr. C.
D'Alfonso, Ten. A.
De Cristofaro, Cap. F.

Military.

Agostini, Capt. V. (45)
Bailo, Lieut. (74)
*Bolla, Capt. (89)
Cannonieri, Lieut. (22)
†Cammarotta, Lieut. (15F)
De Filippi, Com. (5)
*De Rada, Lieut. (38)
*Falchi, Capt. (55)
Garassini. (29)
*Gavotti, Lieut. (25)
Gazzera, Lieut. (20)
Guidoni, Capt. (58)
*Lemignani, Lieut. (33)
†Manzini, Lieut. (98)
Moizo, Capt. (40)
Neri, Lieut. (345-Ae. C. F.) (106)
*Palmadi, Cesnola Lieut. (75)
*Piazza, Major (44)
Pizzagalli, Capt. (49)
Poggi, Lieut. (82)
Prandoni, Capt. (69)
*Pulvirenti, Lieut. (50)
Raffaelli, Lieut A. (108)
Ravelli (453, Ae. C. F.)
Roberti, Lieut. (47)
Rossi, Capt. (27)
†Saghetti, Lieut. (16)
Savoia, Lieut. T. U. (4)
Surdi, Lieut. (32)
*Vece, Lieut. F. (74)
†Vivaldi, Lieut. (31)

Brevets in 1912.

Andriani, Capt. O. (137)
Antonini, Capt. L. (91)
Almerigi, F. (150)
Alvisi, Lieut. A. (172)
Baglione, Lieut. A. (129)
Barsera, F. (167)
Bonamici, L. (101)
Bongiovanni, Lieut. E. (115)
Bongiovanni, e. L. . (124)
Bonuti, R. (135)
Bnch, Lieut. F. (146)
Buzzi, Lieut. M. (156)
Calderara, Lieut. A. (134)
Calori S. (130)
Capuzzo (143)
Casalella, Lieut. G. (121)
Clerici, Lieut. U. (110)
Cuzzo, Capt. A. (166)
De Giovanni, Lieut. G. (101)
De Riso, Lieut. G. (135)
Della Chiesa conte, Lieut. A. (109)
Ercole, Lieut. E. (117)
Franceschi, Lieut. E. (112)
Gallotti, Lieut. A (150)
Garino ing, G. (134)
Girotti, Lieut. M. (109)
Giordesco, Lieut. M. (151)
*Graziani, Lieut. C. (92)
Jacoponi, Lieut. A. (171)
Kerbaker, Lieut. E. (99)
Laureati, Lieut. G.
Loffi dott. sott. sod. A. (169)
*Marero, M. A. (90)
Moreno, Capt. G. (78)
Nosari, G. (142)
*Norellis di Cozrazze, Capt. A. (94)
Oddo, A. (147)
Pagano, P. (158)
Palpucelli, A. (164)
Perrucca, D. (162)
Poggioli. Q. (107)
Pongelli, R. (60)
Porta, Capt. E. (145)
Prandoni, Capt. E. (69)
Resio, Lieut. (120)
Rosetti, A. (157)
Rossi, Lieut. S. (152)
Suglia, Lieut. C. (118)
Torelli, F. (165)
Vahlinire, Lieut. F. (170)
Venanzi, U. (155)
Zamuso, Lieut. G. (149)

Naval.

(To end of 1911).

Calderara, Lieut. (1)
Ginnochio, Lieut. (18)
*Rossi, Sub. Lieut. (31)
Strobin, Lieut. (39)

(During 1912).

De Muro, Lieut. (119)
Frigerio, Lieut. (154)
Scelsi, Capt. difrcg. G.

Private.

(To end of 1911).

Akachew, C. (61)
Amerigo (3)
Barigiola, G. (51)
Battagli, R. (34)
Bianeli, P. (6)
Biego, C. (56)
Bigliani, A. (63)
Borgotti, G. (45)
Brilli, D. G. (48)
Broeiner, M. (87)
Cagno, C. (10)
Cagliani, A. (23)
Cannoniere, Umberto (22)
Cattaneo, Bartelomo (2)
Cavaglia, Pietro (30)
Cavalieri, Alfredo (17)
Cei, A. (53, Ae. C. F.)
Casaroni, A. (77)
†Cirri, Ciro (31)
Cobianchi, *Marini* (24)
Darioli, Ernesto (9)
Da Zara, Leonino (7)
De Agostina, A. (53)
De Antonis, A. (67)
Faccioli, Mario (21)
Franzoni, R. (62)
Garassini, G. G. (29)
Gianfelice (59)
Ginnochio, T. (18)
Graziani, nob. Ettore (28)
Lasetti, A. (19)
Maffeis, G. (36)
Maggiora, C. (72)
Manussero, R. (32)
†Marra, R. (35)
Marrzo, E. (32)
Mogafice, Mario (26)
Mosca, Francesco (47)
Pasquali, R. (66)
Picollo, G. (32)
Poggioli, Quinto (117)
Porro, A. (113)
Ramassotto, M. M. (148)
Ravetto, Clemente (12)
Ré, Umberto (86)
Ruggerone, G. (14)
Sabelli, G. (93)
Santoni, L. (114)
Stucchi, Federico (8)
Verona, A. (54)

(Brevets in 1912).

Amour, ing. E.
Arista, A. (131)
Ballerini, M. (132)
Bergonzi, P. C. (78)
Berni, L. (95)
†Bertoletti, R. (79)
Borsalino, G. M. (102)
Brunetta D'Usseaux, G. (125)
Buzzio, E. (100)
Caraballi, C. (104)
†Caramanlaki, A. (97)
Caramanlaki, G. (168)
Carminati di, B. N. (163)
Colucci, G. (80)
Corsini, J. C. (133)
Corsini, A. E. (85)
Dalla, N. C. (126)
Dal Mistro, C. A. (127)
De Campo conte, S. (105)
Fabri, A. (165)
Facchini, E. (141)
Garino, G. (134)
Gelmetti, A. (83)
Grassi, conte A. (88)
Leonardi, G. (122)
Mandelli, P. (96)
Marazzi, E. (140)
Nardini, G. (128)
Paolucci, G. (144)
Piceller, G. (105)
Sacerdoti, C. (116)
Salengo, R. (138)
Valle, C. (86)
Zorra, L. (84)

Private Aeroplanes.

At the end of March, 1913, there were about 45 machines in use at the various private schools, and about 6 privately owned aeroplanes.

A

ANTONI. Soc. di aviazione Antoni, via Vitt. Emanuele, 46, Pisa. School: S. Guisto, Pisa. Output capacity: about 20 machines a year.

	1912-13. Single seat mono.	1912-13. 2-seater military mono.
Length ... ... feet (m.)	33 *10*	36 *11*
Span ... ... feet (m.)	28 *8·50*	28 *8·50*
Area ... ... sq. feet (m².)	172 *16*	237 *22*
Weight ... machine, lbs. (kg.)	660 *300*	770 *350*
useful ...lbs. (kg.)	...	...
Motor ... ... h.p.	Gnome or Anzani	Gnome and Anzani
Speed ... max. m.p.h. (km.)	...	...
min. m.p.h. (km.)	...	...
Endurance ... ... hrs.	...	...
Number built during 1912 ...	...	...

ASTERIA. Fabbr. Ital. Aeroplani ing. Darbesio e C., via Salbertrand, 12, Torino (Turin). School: Mirafiori. Capacity: small.

	1912-13. Monoplane.	1912-13. Biplane.
Length ... .. feet (m.)	21¼ *6·50*	29½ *9*
Span ... ... feet (m.)	26½ *8·10*	44 *13·50*
	...	24½ *7·50*
Area ... ... sq. feet (m².)	162 *15*	431 *40*
Weight ... machine, lbs. (kgs.)	530 *240*	110 *500*
useful ...lbs. (kgs.)	...	...
Motor ... ... h.p.	50 Gnome	70 Renault
Speed ... max. m.p.h. (km.)	...	...
min. m.p.h. (km.)	...	...
Endurance ... ... hrs.	...	...
Number built during 1912 ...	...	...

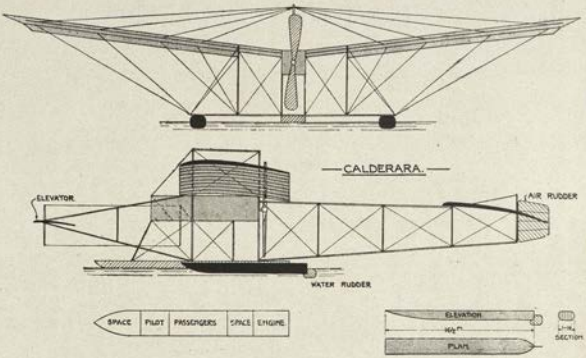
B

BOSSI. Builds flying boats, &c., several of which have been sold to foreign navies as well as for use in the Italian Navy. Details not received up to time of going to press.

C

CALDERARA. Navy hydro-monoplane.

Model 1912-13.		"Hydro vol"
Length	feet (m.)	54 *16·50*
Span	feet (m.)	61 *18·50*
Area	sq. feet (m².)	753 *70*
Weight ...	total ...lbs. (kgs.)	2644 *1200*
	useful ...lbs. (kgs.)	...
Motor	h.p.	150 (formerly 100 Gnome)
Speed ...	max. m.p.h. (km.)	62 *100*
	min. m.p.h. (km.)	50 *80*
Endurance	hrs.	6½
Number built during 1912 ...		1



Lieut. Calderara's floats consist of a plurality of w.t. compartments with internal lattice frame, well braced. Hull is formed of three skins of wood, sail-cloth between each. Distance between outer floats, 21 feet (6·39 m.). Centre of gravity is only 4½ feet (1·40 m.) above water. If necessary wings can be cut away and the central hull used as a boat with emergency sail.

C.—*continued.*

CAPRONI. Soc. di Aviazione Ingg. Caproni e Faccanoni, Vizzola Ticino. School: Vizzola Ticino.

Models 1912-13.	Single seat mono. A.	Single seat mono. B.	2-seater mono.	3-seater mono.
Length ... ... feet (m.)	26½ 8	26½ 8	...	...
Span ... ... feet (m.)	29 8·80	29 8·80	...	...
Area ... ... sq. feet (m².)	162 15	162 15	172 16	226 21
Weight ... machine, lbs. (kgs.)	485 220	660 300	750 340	760 345
Weight ... useful ... lbs. (kgs.)	...	...	...	...
Motor ... ... h.p.	35 Anzani	50 Gnome	60 Anzani	80 Gnome
Speed ... max. m.p.h. (km.)	56 90	75 120	75 120	87 140
Speed ... min. m.p.h. (km.)	...	...	...	...
Endurance ... ... hrs.	3½	...	...	4
Number built during 1912 ...	...	...	...	...

Remarks.—At end of 1912, held Italian record for speed, 200—300 k.m. Flown by Cobioni.

CAPRONI-BRISTOL. Caproni also builds under Bristol license.

CHIRIBIRI. A Chiribiri e. C, via Lamarmora 28, and via Don Bosco 68—73, Torino (Turin).

Models 1912-13.	45 h.p. mono.	50 h.p. mono.	Racing mono.	80 h.p. mono.
Length ... ... feet (m.)	23 7	23 7	24½ 7·50	25¾ 7·80
Span ... ... feet (m.)	29½ 9	29½ 9	31 9·30	39⅓ 12·20
Area ... ... sq. feet (m².)	204 19	204 19	226 21	258 24
Weight ... machine, lbs. (kgs.)	595 270	683 310	772 350	595 270
Weight ... useful ... lbs. (kgs.)	...	...	...	...
Motor ... ... h.p.	45 Chiribiri	50 Chiribiri	60 Chiribiri	80 Chiribiri
Speed ... max. m.p.h. (km.)	44 70	56 90	103 165	65 105
Speed ... min. m.p.h. (km.)	...	...	...	...
Endurance ... ... hrs.	...	...	...	...
Number built during 1912 ...	...	...	2	...

F

FRIULI. E. Pensuti e E. Calligaro, Pordenone. School: Pordenone. A 30-35 h.p. Anzani motor monoplane. Area, 150 sq. feet. (14m²). Generally of *Blériot* type, but *Hanriot* type landing carriage.

G

GUIDONI. Naval Hydroavions. Either a *Farman* biplane or a *Nieuport* mono. is used, mounted on special floats designed by Capitano del Genio navale Guidoni. There are two long floats, each of which is fitted with parallel fins.

FOREIGN AGENCIES.

Foreign types of machines are constructed in Italy under licenses as follows:—

BLERIOT. Soc. Ital. Transaereo, corso Peschiera 25, Torino (Turin).

BRISTOL (British), by Caproni.

DEPERDUSSIN. Soc. Ital. degli Aeroplani, via Giulini 7b, Milan.

NIEUPORT. Carrozzeria Macchi. Varese.

ITALIAN MILITARY DIRIGIBLES.

Name and date.		Army. P1. 1909.	Army. P2 & P3. 1910 & 1911.	Army. P4 & P5. both 1912.	Army. Citta di Ferrara 1914.	Army. Parseval. (P. L. 17). 1912-13.	Navy. M1. 1912.	Navy. M2 & M3. 1912 & 1913.	Navy. V1. a. r.	Navy. Parseval.
Volume	c. feet	148,000	155,000	166,000	424,000	353,000	424,000	424,000	...	...
	(m³.)	4200	4400	4700	12000	10000	12000	12000	14650	18000
Length	feet (m.)	197 60	207 63	207 63	233 72	279 85	272½ 83	272½ 83	...	...
Diameter	feet (m.)	38 11·60	38 11·60	39½ 12	59 18	52½ 16	56 17	56 17	...	...
Gas bags: fabric		Silk	Continental	Continental	...	Riedinger	Metzeler	Metzeler	...	...
Gas bags: compartments		7	8	8	...	0	...	...	...	...
Gas bags: ballonets		1	1	1	...	2	...	...	...	...
Lift: total tons		3·50	3·50	3·75	...	...	9·50	9·50	12	...
Lift: useful tons		1·10	1·35	1·50	...	3·00	3·80	3·80	...	...
Motor	h.p.	1-100 C. Bayard (=100)	1-120 C. Bayard (=120)	2-80 Fiat (=160)	3-85/100 Isotta (=300)	2-170 Maybach (=340)	2-250 Fiat (=500)	4-125 Wolseley (=500)	... (=400)	... (=600)
Propellers: number		2	2	2	3	2 Parseval	2	2	...	...
Propellers: blades		2	2	2	3	4	4	4	...	...
Propellers: diameter feet	(m.)	10 3	10 3	10 3	14 4·20	...	12½ 3·80	12½ 3·80	...	...
Max. speed	m.p.h. (km.)	32 52	35 56	37 60	45 72	40 65	44 70	44 70	56 90	47 75
Full speed endurance	hrs.	...	...	...	24	20	12	12	24	...
Max. complement		5	5	5	...	...	14	14	...	...
Station		Bracciano	Tripoli	Vigna di Valle		Venice	Bracciano		*building*	*building*

Notes.—All the above are semi-rigid. The *P* and *M* are all of the same general type. Principal features of these ships, which were designed by Captains Crocci and Ricaldoni, are the shape of the envelope, (maximum diameter very far forward), keel and the box kite tail. The *Citta di Milano* (semi-rigid) is an enlarged *Leonardo da Vinci* (which see). *Special feature* is the keel built into the envelope. This serves as a nacelle.

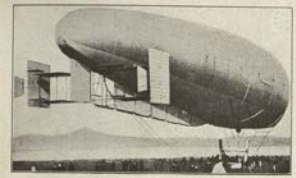
Building.—One *Parseval* (P.L. 15) about the same size as the other (P.L. 17), which was completed first.

Army Dirigible Pilots.

Agostoni, Capt.
Biffi, Ten.
Bosio, Ten.
Crocco, Capt. G.
Dal Fabbro, Capt. C.
Denti di Piraino, Marchi, Capt.
Galloni, Ten.
Longo, Ten.
Manni, Ten.
Menenti, S. Ten.
Merzari, Capt.
Messina, Ten.
Munari, Capt. E.
Pastina, Capt.
Ricaldoni, Capt. A.
Scelso, Ten L.
Seymandi, Capt. G.
Stabarin, Ten.
Tagliasacchi, Ten.

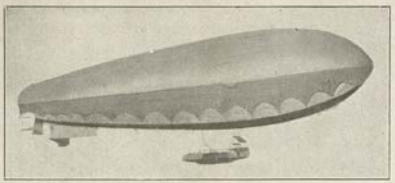
Navy Dirigible Pilots.

Carniglia, Ten. d. vas.
Castracane, C. Ten. di V.
Forlanini, Ing. C. E.
Gravina, Ten. d. v. Conte M.
Penco, Ten. d. v., A.
Piccoli, Dom.
Ponzio, Ten. d. v., E.
Scelsi, Capt. di I., G.
Usuelli, C.
Valerio, Sot. V.
Valli, Ten. d. v., G.

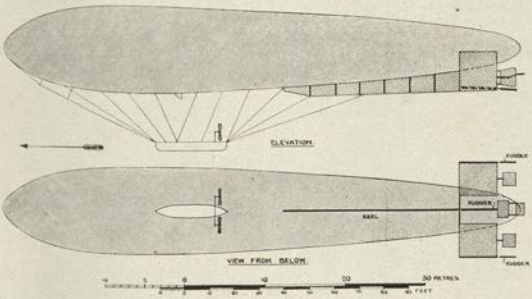


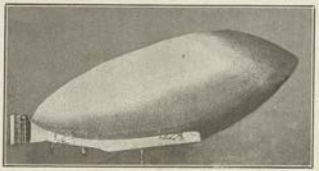
P. I.

Elevation of P. I. The later ships only differ in dimensions, and the fact that the middle rudder is done away with.

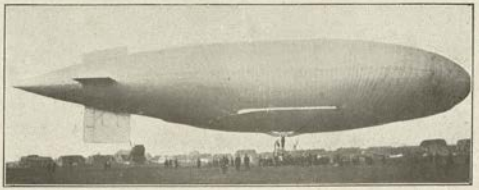


Dirigibles M1 & M2.





Città di Milano.



159 Parseval (P.L. 17). First Italian *Parseval.*

ITALIAN PRIVATE DIRIGIBLES.

Name and date.	Ausonia bis. Reconstructed 1910.	Italia I. 1905.	Italia II. 1913.	Leonardo da Vinci. 1909.	Usuelli. 1909.
Volume ... ... (m^3.)	**1500**	**1500**	**2600**	**3265**	**3870**
Length ... ... feet (m.)	121 37	128 39	164 50	131½ 40	167½ 51
Diameter .. feet (m.)	27 8·25	19¾ 6	32¾ 10	46 14	32 9·80
Gas bags — fabric	...	...	...	...	...
Gas bags — compartments ...	nil.	nil.	nil.	7	6
Gas bags — ballonets	1	nil.	nil.	1	1
Lift ... total ... tons	...	1·35	2·20	3·00	...
Lift ... useful .. tons	0·80	...	...	...	...
Motor ... ... h.p.	1-55 h.p. S.P.A.	1-40/50 Antoinette	1-50 h.p.	1-40 Antoinette	1-80 h.p. S.P.A.
Propellers — number	1	1	2	2	2
Propellers — blades	2	2	2	5	2
Propellers — diameter, feet (m)	10½ 3·20	15 4·50	10 3	9 2·70	...
Max. speed ... m.p.h. (k.m.)	25 40	25 40	...	...	30 50
Full speed endurance... hrs.	...	...	...	...	6
Max. complement	...	...	...	...	...
Station	Bosco Mantico	Schio	building	Laid up at Baggio near Milan	Turin

Notes:

Ausonia. Nico Piccoli, via Accademia 12, Padova (Padua). Works: Magrè, Vicenza (Schio). Semi-rigid.

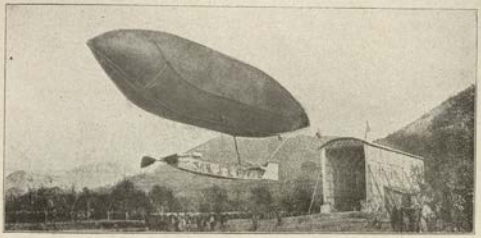
Italia. Cent Almerico da Schio, Schio. Non-rigid. *Special features* is a "belly" of Para rubber in lieu of a ballonet.

Leonardo da Vinci. Ing. Enrico Forlanini, via Boccaccio 21, Milan. Works: Baggio. Semi-rigid, keel and nacelle, incorporated in envelope.

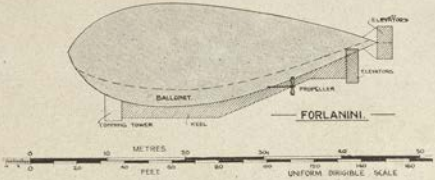
Usuelli. Usuelli and Borsalini, Torino (Turin). Non-rigid.

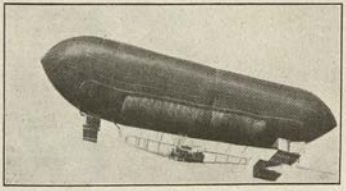
Private Dirigible Pilots.

Forlanini, ing. E.
Piccoli, D.
Usuelli, C.

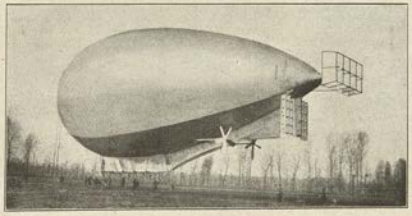


ITALIA.





USUELLI.



LEONARDO DA VINCI.

JAPANESE.

(Naval Aviation data: Official).

Aerial Societies:—

Taikaku Kenkyukai (Hibia Buildings, Kojimachiko, Tokyio).

Kikyu Kinkyu Kai (connected with War Office).

Flying Grounds:—

Near **Yokohama**, (Naval).

Oihama.

Saitama, Tokoronawa (Army).— Dirigible shed and hangars.

General Military Aviation.

This was originally formed as one body without distinction between army and navy. It was subsequently re-modelled on lines somewhat similar to the British Royal Flying Corps with naval and military wings.

Navy.

The naval section is superintended by Capt. K. Yamaji, I.J.N.

The naval headquarters are at Oihama (near Yokosuka).

The naval force in March, 1914, consisted of 10 hydro-aeroplanes (3 *Curtiss*, 2 *Deperdussins* and 5 *Farman*). The available total of qualified naval aviators was 20.

Finance.

The total amount granted for aviation of the navy in 1912 (fiscal year) was 100,000 yen (£10,000).

For the year 1914 the estimates amount was 100,000 yen.

Army.

The army wing is responsible for the dirigibles. It has also a few aeroplanes.

AVIATORS.

Military.

Hino, Major
Saigom, Capt.
Tokogawa, Capt.
Tokogama, Lieut.

Naval.

Adachi, Sub. Lt.
Fujise, Sub. Lt.
Hanashima, Engr. Lt.
Hirose, Sub. Lt.
Ikura, Sub. Lt.
Inouye, Lt.
Makoshi, Sub. Lt.
Nakajima, Engr. Lt.
Nanba, Sub. Lt.
Osaki, Sub. Lt.
Shoji, Engr. Lt.
Tada, Engr. Lt.
Takebe, Sub Lt.
Wada, Sub. Lt.
Yamada, Lt.
Yamamoto, Sub. Lt.
Yamashita, Engr. Lt.

Private.

Doig, S.
Iga, Baron
Shigeno, Baron
Tsuzuki,
Yamada, Isaburo

The following have been killed:—

1912.
Aibata, Lieut.

1913.
Kimura, Lieut.
Tokuda, Lieut.
Takeishi.

Private Aviation.

There are some private aeroplanes being regularly flown in Japan. A number of aeroplanes have from time to time been invented by naval and military officers and private individuals, and some of them are in use. Inventors include Major Hino, naval constructors Narahara and Ushioki, Baron Iga, Baron Shigeno and Mr. Tsuzuki.

JAPANESE DIRIGIBLES.

PARSEVAL type. *Military.*
(P. L. 13.)

Length, 259 feet / 79 m. **maximum diameter,** 47½ feet / 14·50 m. **capacity,** 8,500 m³.

Gas bag.—2 ballonets. Usual Parseval.

Motors.—Total, 300 h.p., made up of two 150 h.p. Maybach.

Speed.—42 m.p.h. (65 km.)

Propellers.—Two 4-bladed. Parseval.

Steering.—Usual Parseval (see GERMAN).

Remarks.—Of *Parseval P.L. 12* type (see GERMAN). Built 1911.

YAMADA. Non-rigid. *(Private.)*

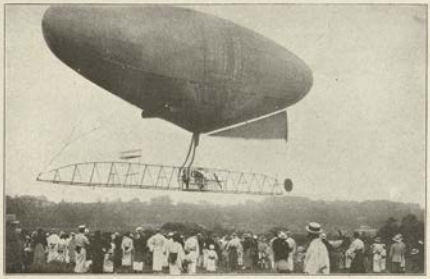


Photo by favour of M. Samuro Kubi.

Maximum length, feet / m. **maximum diameter,** feet / m. **volume,** 700 m³. *(about)*

Gas bag.—

Motor.—American make.

Speed.—

Propeller.—One.

Steering.—Biplane elevator forward. Triangular rudder in rear under gas bag.

Remarks.—Generally of American type.

MEXICAN.

Army Aeroplanes.

There are 2 old pattern *H. Farmans*; also one or more *Curtiss* and *Wright* machines. Nothing seems doing with them.

AVIATORS.

Military.

Martinez, N.
(Ae. C. F. 462)
Mendia, (Ae. C. F. 680)

Private.

Duval, Raoul
Lebrija, Miquel
Morales
Noriega
Ramsey, E. L.
Saavedra, Alfonso

Probably 2 others

(The above are mostly amateur builders.)

NORWEGIAN.

Aerial Societies:—

Aero Club, Norsk Flyveselskad (Christiana). Secretary, D. Barth.
Norsk Luftseilads Forening (Christiana). President, H. Mohn.

Aerial Journals:—

None.

Flying Grounds:—

Military Aviation.

At the end of 1912 the Army possessed two 70 h.p. *M. Farmans* (Renault motors), and the Navy a 100 h.p. N.A.G. *Rumpler*.

For 1913 the purchase of further machines is contemplated for both arms.

Private Aeroplanes.

Total at end of **1911** 1

At end of 1912 there were in existence 2—a *Grade* and a *Deperdussin*.

AVIATORS.

Military.	*Private.*
Diehl, Lieut.	Hansen.
Jacobsen, Lieut.	St. Dons.

PERUVIAN.

Military Aeroplanes.

The Peruvian Government has made a special grant for aviation students, and war machines are projected. Actual order to end of 1912 was one *Aero* mono.

AVIATORS.

Bielovucic, J.
Chavez, J.
Montero (766 A.C.F.)

Peruvian aviators killed:

1910.
Chavez, G.

1911.
Tenaud, C.

PORTUGUESE.

Aerial Societies:—

Ae. C. de Portugal (Praça dos-Restoradores, 16, Lisbon).

Aerial Journals:—

Rivista Aeronautica (Ae. C. Journal.)

Flying Grounds:—

Campo do Seigeal. (Military School, 6 hangers.)
Mouchavo da Pavoa. (Private, 5 hangers).

Private Aviators.

De Castro, Sanchez
De Silva, Gomez
Castello Brancho

Killed.

Noronha

Military Aviation.

In 1912 a military corps was formed. At the end of 1913 it possessed 3 biplanes.

ROUMANIAN.

Army Aeroplanes.

At end of March, 1913, there were several 80 h.p. *Bristol* monos., 2 *Blériots*, 1 *Nieuport*, 1 *Morane*, 2 *Vlaiclu*, and several *H. Farman* biplanes.

Government school is at Bucharest.

AVIATORS.

Military.	*Private.*
Capsa, Lieut.	Bibesco, Prince
Negrescu, Lieut.	(Ae. C. F. 20)
Protopopscu, Lieut.	Oznoth
Vacas, Lieut. Poly	
Zorileann, Lieut.	
(Ae. F. 387)	

***VLAICLU* Monoplane.** Designed by Ouvret Vlaichu. First shewn at the Vienna Exhibition, 1911. Modified; it flew very well indeed at Aspern, June, 1912. The 1912 model is of entirely novel type, a tail first monoplane with a propeller either end of the main planes, and a triangular tail aft. Principal details are:—**Length,** 34½ feet (10·50 m.) **Span,** 30 feet (9·15 m.) **Height,** 12 feet (3·65 m.) Wing frame in three sections with gap between. **Motor,** 50 h.p., Gnome chain driven. **Fuselage,** old style; landing chassis on three wheels only, with a single ash skid in front. Covered in engine driving the 31 foot propeller shaft for the 2 propellers. Rear tail consists of 2 fixed planes, a triangular damping plane and a triangular keel plane. Forward, an elevator and two semi-circular rudders (double faced). From this combination remarkable results are achieved, and all gyrostatic effect from the propellers eliminated. *Control*, horizontal wheel on column. Elevator depressed or otherwise by action on column. *Note.*—At Vienna, 1912, this machine took first prize for the smallest circle and also for accurate bomb-dropping. The original machine was purchased by the Roumanian Army.

RUSSIAN.

General Note.—In the number of military machines and general attention to aviation Russia is only second to France. There are no effective machines of Russian design, but the Aviataka, Dux & Lomatuk firms build at home under foreign license, and there is also the Kennedy school (Anglo-Russian).

Aerial Societies:—

(Imperial) Aero Club. 1. Odessa branch.
2. Rostow and Don branch.
3. St. Petersburg "
Finland Ae. C., Helsingfors.
Kieff University Ae. C., Kieff.
Moscow Ae. C., Moscow.
Moscow Imp. Tech. College (Aviation Section).
Riga Ae. C., Riga.
Russian Aeronautical Society, St. Petersburg.
Sevastopol Ae. C.
Students' Aviation Club.
Tomsk Ae. C., Tomsk.
Volunteer Aerial Fleet.

Aerial Journals:—

Aeronautical Journal of St. Petersburg.
Aero (6, Liteiny, St. Petersburg). Weekly.
Dans l'Empire des Airs (7, Rota 26, Petersburg). Fortnightly.
Revue de Navigation Aérienne (7 rue Stremnniannaya, Petersburg). Weekly.
Sport (25, Ekaterineska, Odessa).
Woeudokhoplavatel (St. Petersburg). Monthly.
Woeudushoplavanie y Sport (Moscow). Monthly.

Flying Grounds:—

Gatchina Park.—Flying here under restrictions. V.F. school.
Kieff.—School for pilots.
Kolomiagg.—Racecourse.
Novo Therkask.
Odessa.
St. Petersburg.—Kennedy school.
Sevastopol.—Volunteer Fleet school.
Warsaw.

RUSSIAN MILITARY AVIATION.

Army Aviation.

Early in 1912, under the presidency of the Grand Duke Alexander, the special school of the Volunteer Aerial Association was finally formed at Sevastopol for the winter and Gatchina for the summer.

June 1912. Vote for 150 aeroplanes (140 to be built at home). Vote 1,050,000 roubles for new school at Tauride.

November, 1912. Military trials results. (1) Sikorsky in a *Sikorsky*. (2) Haber in a *M. Farman*. (3) Boutmy in a *Nieuport*.

December, 1912. Aeronautical school re-organised. Put under control of one commandant, one assistant, and four juniors. Course made seven months - 15 pupils per school at a time. A one month course in aeroplanes, aerial motors, etc. Of the pupils, 10 will be selected for aeroplanes. New flying school established at Taskend in Turkestan.

March, 1913. New schools established at Moscow, Odessa and Omsk.

At the end of 1911 the total number of military aeroplanes was about 100. At the end of March, 1913, the total number was about 250, of which about 150 were modern. Principal types: *Albatross, Aviatik, Bristol, Deperdussin, Farman, Nieuport, Rumpler*, there being an average of 20 of each. The majority built under Russian license in Russia. The number of actual military pilots was 72. There is, however, a special volunteer corps of about 36 private aviators, bringing the available total to 108 or thereabouts.

Navy Aviation.

July, 1912. Lieut. Andreadi, 50 h.p. *Nieuport*, did a flight with stops from Sevastopol to St. Petersburg.

September, 1912. Special naval aerodrome for hydro-avions ordered for Golodai Island, near Petersburg, bringing total of military and naval aerodromes to 6. *Sikorsky* hydro-avion acquired. Also an *M. Farman* ditto. New naval station projected at Libau.

October, 1912. Naval purchase of several *Curtiss* hydro-avions after trials at Sevastopol.

At the end of March, 1913, the approximate effective force was as follows (all hydros, or capable of being so fitted): 1 *Astra*, 1 *Breguet*, 2 *Donnet-Leroque*, 1 *Farman*, 4 *Paulhan Curtiss*, 2 *Nieuport* (50 h.p.), 1 *Sikorsky*. (A number of others on order.)

Early in 1913 experiments were carried out with a combination of floats and skids, invented by M. Lobanoff, of Moscow. This proved equally effective on land or water.

AVIATORS.

The following are army, navy or volunteer aviators. The number is the Russian Ae. C., unless otherwise stated. F = French. Prefix † = killed. n = navy.

Abramowitch Wissewold (14)
Agababa, N. (668 F.)
Agofonoff (20)
Aleknovitch, G. (29)
Alexandroff, D. (472 F.)
n Andreodi, Lt.
Artsgoulieff (44)
Avinass, J. (60)
Badowski, L.
Bakhmoutoff, N. (6)
Berdchenko, V. (7)
Bistritsky, V. (8)
Bouksbevden, Bar. G. (10)
Boutmy (de) E.
Campo, Scipio (211 F.)
Childovski (67)
Chioni, B. (250)
Chimansky (27)
Choudinoff (46)
Dmitrieff, J. (9)
Dorogouski (125 F.)
Dougouswzky, A. (1)
n Dyborski, V. (12)
Efimoff, M. (31 F.)
Efimoff, T.
Erdeli, G. (45)
Eristov, Prince (524 F.)
Evsukoff, P. (21)
Firstenberg
Flegfier, von.
Gelgar (33)
Glouchenko, S. (48)
Godoulsky A. (59)
Gorghkoff, G. (626 F.)
Goumberto-Dros, B. (58)
Grekoff G. (56)
Grigoraschiriffy (577 F.)
Houeninsey A (227 F.)
Husarenko (22)
Illin, A. (16)
Iougmeister (52)
Jankovsky, G. (24)
Joukoff (37)
Kaidenoff (42)
Kamensky, V. (66)
Katzian, A.
† Kauzminski (228 F.)
Kehouroff, V. (210 F.)
Kirchstern
Kolchin, F. (28)
Komaroff, M. (245 F.)
Kostine, N. (223 F.)
Kaunzenoff, P.
Kreiner, E.
Kromm, A.
Lachtionoff, G. (57)
Lambert (de) C. (8 F.)
Lebedeff, V. (98 F.)
Lerche, M. (25)
Lewkowiez, H. (327 F.)
Limo, G. (15)
Lipowski, H. (330 F.)
Koktoff (61)
Makaroff, D. (13)
Makeef, P. (5)
Matyevitch, Matzevitch (152 F.)
n†Matyevitch, Capt. (178 F.)
Meybaum, T.
Miller (35)
Monakoff, (565 F.)
Naidenoff, G.
Nasdennikoff, B.
Nikiforoff (18)
Nikolaieff (49)
Nikolsky, P. (17)
Oulianine, S. (181 F.)
Pchanowsky, B. (466, F.)
† Pietrowsky, G. (195 F.)
Porcheron, J. (640 F.)
Popoff, N. (50 F.)
Poliakoff, A. (50)
Poplavko (34)
Pougolowski, W. (4)
Pristcheff (38)
Raevsky, A. (F.)
Raygorodsky, A. (207 F.)
Rossinsky (68)
n Rouaroff, M. (245 F.)
Rynin, N. (23)
Sewkowicz, L.
Salesky (41)
Samoilo (11)
Samouiloff, P. (51)
Semenovitch (226 F.)
Semenko-Slavorossoff, H. (40)
Semitan (36)
Seversky-Prokofieff, N. (47)
Sewkowicz, L.
Shidlocvsky, M.
Shimansky, K.
Shinkevitch, V.

[*Continued on next page.*

AVIATORS.—*(continued.)*

Sikorsky, I. (63)
Skarginsky, A. (43)
Slusarenko, W.
† Smith, V. (231 F.)
Sobansky Graf. (3)
Socchnikoff, A.
Soupnevsky, C. (26)
Springsefeld
Sredinsky, A.
Strelnikoff (71)
Tebeniakoff (72)
Tkatcheff, V. (64)
Tounochensky (32)
Tselary, I. (54)
Wassilieff, A. (225 F.)
Zaikine (191 F.)
Zelinsky, Col. (273 F.)
† Zolotouchin, M. (31)

CIVILIAN AVIATORS.

There are very few purely civilian aviators in Russia. Russians who have obtained brevets include Milles Asarta (52), Golantchikova (55), Zvereva (30), Count de Lambert (8 F.) and Count Malynski (209 F.) and one or two others. Few or none do any flying now.

A—Z

AVIATIK. St. Petersburger Aviatik Gesellschaft, Petersburg. Construct Aviatiks. (See GERMANY.)

BRONISLAWSKI. Experimental biplane with special stabilising features.

DUX. Fabrica Moscovita Tnerskaja "DUX," Lastawa, Moscow. Construct under license.

GELTOUCHOW. W. G. Geltouchow and A. W. Preiss, 4 Piasnitzkajai, Moscow. Constructs.

GILBERT. C. Gilbert, 195 Twerskaja, Moscow. Constructs.

KENNEDY. Soc. d. Dirigibles and Aeroplanes Kennedy, St. Petersburg.

MOTOR. Riga-Sassenhof.

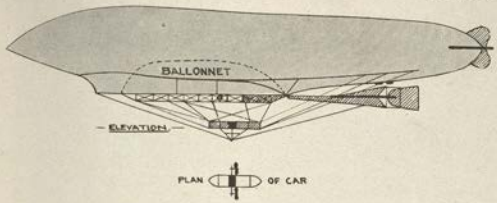
RODJESTVEISKY. Built a triplane in 1911.

RUSSIAN MILITARY DIRIGIBLES (13).

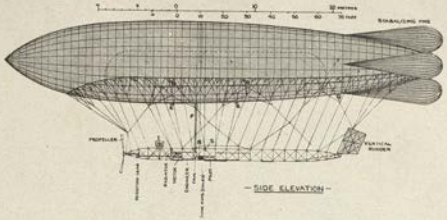
	(1)	(2)	(3 & 4)	(5, 6, 7)	(8)	(9)	(10)	(11)	(12)	(13)
Name	**LEBEDY.**	**KOMMISSIONY.**	**JASTREB** and **GOLOUBJ.**	**ZODIAC VII, VIII & IX.**	**PARSEVAL.**	**FORSZMANN I.**	**FORSZMANN II**	**ASTRA 13.**	**PARSEVAL 14.**	**C. BAYARD 6,** *bis.*
Make	Lebaudy.	C. Bayard I.	Outchebny I & II.		Parseval 7	Forszmann.	Forszmann.			
Date	**1910.**	**1910.**	**1910-11.**	**1910-11.**	**1911.**	**1911.**	**1912.**	**1913.**	**1913.**	**1913.**
System	Semi-rigid.	Non-rigid.	Semi-rigid.	Non-rigid.	Non-rigid.	Non-rigid.	Non-rigid.	Non-rigid.	Non-rigid.	Non-rigid.
Volume ... c. feet (m^3)	3700	3000	1500	2140	7600	800	600	9800	10,000	6200
Length ... feet (m)	200 *61*	184 *56·25*	...	164 *50*	236 *72*	121½ *37*	...	259 *77·80*	270 *85*	250 *77·60*
Diameter ... feet (m)	35½ *10·80*	34½ *10·58*	...	29½ *9*	46 *14*	19½ *6*	...	49 *14·90*	52½ *16*	42½ *13*
Gas Bags ... fabric	Continental	Continental	...	Continental	Continental	...	...	Continental	Reidinger	Continental
ballonets	1	1	...	1	2	...	...	2 (3100 m^3.)	2	2
compartments	3	2	2	...	...	...	...	...	...	...
Lift total.....tons	4	3½	...	2	7	½	½	...	...	7½
useful ...tons	1½	1	...	...	...	...	...	nearly 4	*about* 3½	2¼
Motor ... ... h.p.	1—70 Panhard (=70)	1-105 Clement B. (=105)	1—75 E.N.V. (=75)	1—60 Labor (=60)	2—110 N.A.G. (=220)	1—24 (=24)	...	2—150 Clenu (=300)	2—180 Maybach (=360)	2-130 Clement B. (=260)
Propellers ... number	2	1	1	1	two 4-bladed	1	1	3	two 4-bladed	2
Speed ... m.p.h. (km.)	30 *49*	33½ *54*	13 *21*	33½ *54*	37 *59*	23 *37*	...	36 *60*	43 *68*	...
Notes	*ex La Russie.*		*Jastreb* reported wrecked, March 1913.		Carries 500 litres of petrol. Has done 61 hours at 1500 metres, with 9 on board.		One man dirigible.	Carries 740 litres petrol. Crew 6. Weights: Crew 1014 lbs. Tools, &c. 220 ... Petrol, Oil, &c. 7307 ... 8541 Forward propeller 6 m. diameter; the two after ones 3m each.		Special 2 speed gear to propellers.

Note.—Illustrations see next page.

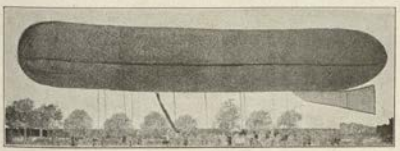
RUSSIAN DIRIGIBLES.



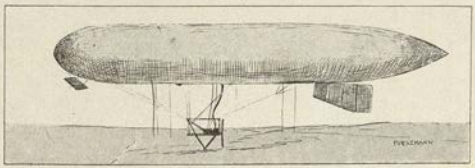
LEBEDI.



KOMMISSIONT.



JASTREB (Outchebny).



Note.—The other dirigibles are of usual type. See FRANCE and GERMANY.

SERVIA.

Military Aviation.

At end of March, 1914, there were about a dozen aeroplanes.

SIAM.

Military Aviation.

Captain N. Thip has been detailed for aviation duties. It is proposed to train a small flying corps.

SPANISH.

(Officially revised by MAJOR ROJAS, R.E.)

Aerial Societies:—

Real Aéro Club de España (27 Alcala Pl., Madrid).
Asociacion de Locomocion Aérea (20 Catalana Sq., Barcelona).
Real Aero Club de Barcelona.
" " de San Sebastian.
" " de Santadar.

Aerial Journals:—

Boletin Official de la Asociacion de Locomocion Aérea, 20, Catalana Sq., Barcelona (monthly).
España Automoril, 5, Isabel II Sq., Madrid. Official organ, Spanish R. Ae. C.

Revista de Locomotion Aerea, 20, Catalana Sq., Barcelona (monthly).

Principal Flying Grounds:—

Cavalanchel Military School.
Octafe, Civil School.
Guadalajara, Aerodrome School.
etuan (Africa).
Melilla.
visla.
Vitoria Garnier School.

Army Aeroplanes.

3 Biplanes, *Henry Farman* (Gnome, 80 H.P.)
6 Biplanes, *Maurice Farman* (Renault, 70 H.P.)
1 Biplane, *Doutre* (Renault, 70 H.P.)
6 Biplanes, *Lohner* (Daimler, 90 H.P.)
3 Monoplanes, *Bristol* (Gnome & Anzani).
7 Monoplanes, *Nieuport* (Gnome, 80 H.P. & Nieuport).
2 Monoplanes, *Morane* (Gnome, 80 H.P. & Rhone, 80 H.P.)

Total: **16** biplanes and **12** monoplanes.

Military Aeronautics.

In 1913, the Military Aeronautical Corps was divided into two parts, Aerostation and Aviation.

The staff is as follows:—

Garcia del Campo, Lt.-Col., R.E., Major of troops, instructor in Meteorology.
Pou, Captain, R.E., Secretary.
Rojas, Major, R.E., Technical business.
Vives, Col., R.E., commanding both branches.

Aerostation.

Almaran, 2nd Lieut., R.E.
Cervera, Lieut., R.E.
Cué, Major, R.E., commanding this branch.
Gautier, Capt., R.E., 1st Balloon Company.
Maldonado, Lieut., R.E.
Millas, Capt., R.E., 2nd Balloon & Airship Company.
Redondo, 2nd Lieut., R.E.
Reiga, Lieut., R.E.

Aviation.

Kindelan, Capt. R.E., commanding this branch.

Instructors in Flying.

Alonso, Capt., A.S.C.
Buños, Lieut., C.
Barron, Capt., R.E., commanding 1st Aeroplane Company.
Bayo, Capt., S.C.
Herrera, Capt., R.E.
Pevez Nuñer, Capt., R.A.M.C.

AVIATORS.

First-class Pilots.

Alonso, Capt. A.S.C.
Baños, Lt. C.
Barron, Capt. R.E.
Bayo, Capt. S.O.
Herrera, Capt. R.E.
H.R.H. Alfonso de Orleans, Capt. I.
Kindelan, Capt. R.E.
Noveno, Lt. I.
Pastor, Capt. R.A.
Perez, Nuñez, Capt. R.A.M.C.
Rios, Capt. I.
White, Lt. C.
Zubia, Lt. I.

Second-class Pilots.

Aparici, Capt. R.E.
Arrillaga, Capt. R.E.
Barreiro, Capt. R.E. (Commander 2nd Company)
Cortijo, 2nd Lt. R.A.M.C.
Cifuentes, Capt. R.A.
Cherigüini, Lt. (Naval)
Davila, Capt. R.E.
Gil de Sola, Capt. (Naval)
Loize, Lt. R.E.
Monasterio, Capt. C.
Montero, Capt. (Civil Guard)
Navarro, Lt. (Naval)
Olivié, Lt. R.E.
Ortiz, Capt. R.E.
San Roman, Capt. R.E.
Sousa, Lt. R.E.
Valencia, Lt. I.
Vinuegra, Capt. (Naval)
Zorrilla, Capt. R.E.

Flying Officers under Instruction.

Alvarez, Capt. R.E.
Arcante, Capt. R.A.
Ayala, Lt. R.A.
Azero, Lt. A.S.C.
Baguera, Capt. R.E.
Balseyro, Capt. R.E.
Balseyro, Lt. I.
Castellini, Lt. R.E.
Castrodera, Major S.O.
Cubillo, Lt. R.A.
Estejani, Lt. R.A.
Gouralo, Capt. S.O.
Lavilla, Capt. R.E.
Loma, Capt. I.
Mataura, 2nd Lt. I.
Mateo, Lt. (Naval)
Montoya, Lt. C.
Nuñer de Wado, Capt. C.
O'Felan, Capt. I (Naval)
Ospinosa, Capt. I.
Perozordo, Capt. R.A.
Prast, Lt. I.
Romeo, Capt. C.
Seoane, Lt. R.E.
Valencia, Lt. R.E.
Vallespin, Capt. I.
Varela, Lt. C.
Zamora, Capt. R.E.

The following Spanish aviators have been killed:

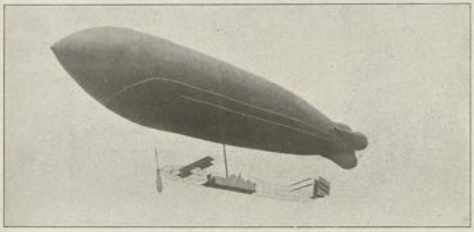
1912.
Bayo, Capt. I.

1913.
Ramos, Lt.

Military Dirigible Pilots.

Herrer, Capt. R.E.
Kindelan, Capt. R.E.
Millas, Capt. R.E.
Vives, Colonel R.E.

ESPANA. Military.
(ASTRA class.)



Maximum length, 197 feet (60 m.) **maximum diameter,** 35½ feet (10·75 m.) **volume,** 43,057 c. feet (4,000 m³.)

Total lift.—9,700 lbs. (4,400 kgs.) **Useful lift.** lbs. (kgs.)

Gas bags.—Yellow coloured rubber proofed Continental fabric.

Motor.—One 100 h.p. 4-cylinder Panhard.

Speed.—29 m p.h.

Propellers.—1, at the front end of the car, of wood, "Integrale" type.

Steering.—As in *Clement Bayard I* and *Ville de Nancy.*

Remarks.—The two side stabilising shapes are duplicated, as they are in the *Ville de Paris.* A webbing stretched on steel tubes is introduced between the inner edges of the 4 main stabilising shapes to provide extra stabilising surface.

TORRÈS-QUEVEDO II. Military.

Maximum length, 147½ feet (45 m.) **maximum diameter,** 32¾ feet (10 m.) **volume,** 56,700 c. feet (1,600 m³.)

Total lift.— lbs. (kgs.) **Useful lift,** lbs. (kgs.)

Gas bags.—

Motor.—60 h.p. Chenu.

Speed.—

Propellers.—

Steering.—

Remarks.—Designed by Captain Kindelan and Engineer Torres Quevedo.

SWEDISH.

Aerial Societies:—

Svenska Aëronautiska Sällskapet (Stockholm).
Kungl. Automobil klubben: (Fenixpalatset, Stockholm).
Svenska Motor-klubben: Aero sektion (Stockholm).

Aerial Journals:—

Svensk Motor-Tidning (Fenixpalatset, Stockholm) Fortnightly.

Flying Grounds:—

Ljungbyhed (Skåne), sheds.
Malmslatt, sheds.

Aircraft Factories:—

Swedish Aircraft Factory, Ltd., Stockholm.
Södertelfji.

Military Aeroplanes.

At the end of March, 1914, the Army possessed 4 or 5 machines.

The Navy about the same number.

There are also a few privately owned machines.

AVIATORS.

(The number against any name is, unless otherwise stated, the Ae. C. Swedish pilot certificate.)

Military.

Bjornberg, Lieut.
von Porat, Lieut. (6)
Ljungner, Lieut. (7)
Hamilton, Capt. (2)
Jungler, Lieut.
Silow, Lieut.

Naval.

Dahlbeck, Lieut. (3)
(British Ae. C. 120)
Werner, Lieut. (9)

Private.

Cedarstrom, Baron C. (1)
Fjällbäck (4)
Angstrom (5)
Sundstedt (8)
Thulin, M.A. (10)
von Segebaden.
Bergqvist, E.
Bjorklund, F. A.
Hygert, J.
Rudberg, A.

ASK. Monoplane.

Harlan type. Built by Ask.

NYROP. Naval Monoplane.

Bleriot 2-seater. Built in Sweden by Nyrop. **Motor,** 50 h.p. Gnome.

DAHLBECK.

Farman type. Built by Lieut. Dahlbeck. 1913.

SWISS.

(By our special Swiss editor.)

Aerial Societies:—

Aero Club Suisse (3, Hirschengraben, Berne). Sec.: F. Filliot.
a Ostschweizerischer V. für L. (Zürich).
b Sektion Mittelschwez (Bern).
c Sektion Westschweizr (Romande) (Lausanne).
d Club Suisse d'Aviation (Geneva).
Club Genévois d'Aviation (Geneva). Sec.: P. Brasier.
Flügsport Klub (Rorschach). Sec.: A. Zürn.

Aerial Journals:—

Bulletin de l'Aero Club Suisse (Berne). Monthly.
La Suisse Sportive (16, Rue de Hesse, Geneva). Weekly.
Sport (35, Boulevard Exterieur, Berne).
Automobil Revue (Berne). Weekly.
Le Sport Suisse (Geneva). Weekly.
L'Auto Sport (Geneva). Weekly.
A.C.S. (Swiss Aut. Clubs) (Geneva). Fortnightly.
Das Illustrierte Programm (Zurich). Fortnightly.
Revue Weinfelden. Monthly.

Flying Grounds:—

Avenches.
Collex-Versoix (Club Suisse d'Aviation).
Lucerne.—60 acre park. Sheds.
Petit Lancy, Geneva (Geneva Club).
Dubendorf bei Zurich.

Dirigible Station (with hangars):—

Lucerne.

Army Aeroplanes.

At the end of March, 1913, there were no army aeroplanes, a *Farman* bought in 1911 having ceased to exist.

Private Aeroplanes.

Total at end of	**1910**	... ...	*about*	10
„	**1911**	... ...	„	15

At end of March, 1913, there were about **15** privately owned aeroplanes.

AVIATORS.

(The number against any name is, unless otherwise stated, the Ae. C. Suisse pilot certificate number.) †=killed.

Military.

Real, Lieut. T. (4)
† Schmidt, Capt. J.

Private.

Audemars, E. (7)
Bianchi, P. (6)
Bider, O. (32)
† Blanc, M. (17)
Bucher, M. (11)
Burkard, H. (29)
Burri, E. (24)
Casser, E. (28)
† Cobioni, E. (15)
Domenjoz, J. (10)
Durafour, F. (3)
Faillonbaz, E. (1)
Grandjean, R. (21)
Guell, R. (12)
† Hödi, G. (25)
Hug, M. (18)
Ingold, K. E. (35)
Jucker, A. (13)
Kramer, H. (31)
Maffei, A. (23)
Parmelin, A. (22)
† Primavesi, E. (34)
Rech, E. (20)
Rettig, J. J. (27)
Reynold, M. (19)
Rochonnet, E. (5)
Rupp, A. (9)
Salvioni, C. (16)
† Schmid, H. (14)
Schumacher, J. (26)
Taddeli, E. (2)
Trepp, M. (30)
Wyss, P. A. (8)
Züst, B. (33)

GRANDJEAN.

TADDEOLI.

WETTERWALD.

Model and date.	GRANDJEAN. Hydro-Monoplane. 1911-12.	TADDEOLI. Monoplane. 1911-12.	WETTERWALD Monoplane. 1912.
Length ... ... feet (m.	33 *10*	19½ *6*	24½ *7·50*
Span ... ... feet (m.)	33 *10*	29½ *9*	33 *10*
Area ... ... sq. feet (m²)	194 *18*	151 *14*	215 *20*
Weight ... total ...lbs. (kgs.)	750 *340*	880 *400*	705 *320*
Weight ... useful, lbs. (kgs.)	310 *140*	330 *150*	...
Motor ... ... h.p.	50 Oerlikon	50 Gnome	40 E.N.V.
Speed ... max. m.p.h. (km.)	62 *100*	69 *110*	...
Speed ... min. m.p.h. (km.)	56 *90*	...	...
Number built during 1912 ...	2	1	1

TURKISH.

Army Aeroplanes.

There is a military aerodrome at S. Stefano, with Amerigo, Renzel and Thanlan as instructors.

In April, 1913, 50 machines were reported ordered in Germany. This report still persists; but only a dozen or less machines appear to have any actual existence. These include a *Curtiss* flying boat, and an order has actually been placed for 30 *Nieuport* seaplanes.

AVIATORS.

Military.

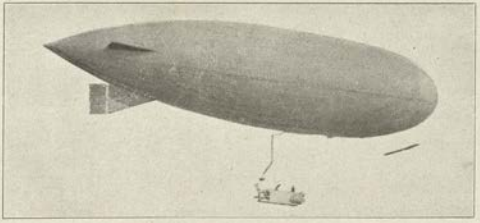
Frazil, Bey
Fessa, Bey
Goys
Kienan, Lt.
Nouri, Lt.
Ratzian
Refik, Capt.
Selim, Bey
Simanoglon, J.

Killed.

Fethie, Bey
Sadik, Bey

MILITARY DIRIGIBLE.

Ex ***"PARSEVAL 10."***



URUGUAY.

Military Aeroplanes.

Lt. Frigierio was despatched about May, 1914, to Europe to purchase the nucleus of a small aerial fleet.

AVIATORS:

Military.

Frigierio, Lt.

Private.

Cameo, M. Gareia

U. S. A.

General Note.—In the early nineties, Professor Langley and the Bros. Wright were experimenting with heavier-than-air machines, but general interest in the subject is quite recent. Though some small dirigibles exist, American attention is mainly devoted to aeroplanes. Ballooning was quite the thing in 1907-11, but has languished.

Aerial Journals:—

Aeronautics.—122, East 25th Street, New York. Fortnightly.
Aircraft.—37, East 28th Street, New York. Monthly.
Aero & Hydro.—Chicago, Ills. Weekly.

Principal Flying Grounds:—

Belmont Park, N.Y.—Old race track. Not very good. Scene of 1910 meet. 30 sheds occupied by few experimenters.
Dayton.—*Wright* school private field.
Chicago, Ills.—Two fine fields.
Fort Myer, Va.—Government and private sheds.
Hammondsport, N.Y.—*Curtiss* factory. Field (small) and lake for water planes.
Los Angeles, Calif.—Several fields in vicinity. Used for *Eaton* school and private flyers.
Marblehead, Mass.—Poor field. Home of Burgess C. Fine for hydro-aeroplanes.
Mineola, N.Y.—*Moisant, Sloane* and another school, and individuals. About 1 by 10 miles level field, without obstructions.
Oakwood Heights, Staten I., N.Y.—The Aeronautical Soc. grounds, on bay for use of hydro-aeroplanes.
San Diego, Calif.—Winter quarters *Curtiss* camp; also used by army flyers.
San Francisco (near).—Good.
St. Louis, Mo.—Kinloch Park. *Benoist* school and private owners.

U. S. A. AERO CLUBS.

An attempt has been made here to give the name of every aero club that has been formed recently in the United States, or has been in existence for a long time. It is believed this list covers every club in the United States.

Many of these clubs are nothing but a name. They were formed to conduct meets or exhibitions, given by the various aeroplane concerns engaged in this business. Many clubs are not incorporated. Others have no organisation, being run by principals of boys' schools or classes.

Clubs even affiliated with the Aero Club of America have no members' meetings, nor have they in many cases even meeting rooms. There are but a half-dozen live aero clubs worthy the name in America. Three clubs own balloons, which are rented to members for ascensions. Little attempt is made by more than one or two associations to popularise aeronautics, to encourage experimenters, or to indulge in scientific work.

The Aero Club of America, the Aeronautical Society and Aero Club of Illinois, are the principal organisations. The Ae. C. represents the F.A.I., and has a beautiful club house. The Aeronautical Society has rooms in the United Engineering Building, conducts well-attended lectures twice a month, and has grounds on Straten Island (for hydro-aeroplanes and aeroplanes).

Clubs affiliated with the Ae. C. of America are marked *

CALIFORNIA.

New Orleans Aero Club, Wm. Allen, Sec., New Orleans
*Aero Club of California, Prof. H. La V. Twining, Pres., 1308 Calumet St. Los Angeles
*Pacific Aero Club, Pacific Buildings, 331 Octavia Street, San Francisco
Postal Aero Club, 305 W. Santa Clara Street, San Jose
University of California Aero Club, T. W. Veitch, Sec., Berkeley
Aero Club of Blackstonehill, Oakland, Calif, c/o W. R. Davis, Jr., 474 Prospect Street
Curtiss Amateur Aviation Club, Harold Scott, Secretary, Los Angeles
Santa Clara Valley Aero Club, Chamber of Commerce, San Jose
Aero Club of Pasadena, W. J. Hogan, Pres., 635 Chamber of Commerce, Box 1054

CONNECTICUT.

*Aero Club of Connecticut, Pres., A. Holland Forbes, at Fairfield
Yale University Aero Club, New Haven
AeroClub of Hartford, Hiram Percy Maxim, Pres., Hartford

CUBA.

*Aero Club de Cuba, Ignario 5, Havana

DELAWARE.

Aero Club of Delaware, Wilmington

DISTRICT OF COLUMBIA.

Washington Aero Scientific Club, F. L. Rice, Sec., c/o Y.M.C.A., Washington
*Aero Club of Washington, Dr. Albert F. Zahm, Sec., Cosmos Club, Washington

ILLINOIS.

*Aero Club of Illinois, F. McCormick, Pres., 240 Michigan Avenue, Chicago
Aeroplane and Kite Club, E. E. Harbert, Pres., 2852 N. Clark Street, Chicago
University of Chicago Aero Club, Chicago
*Aircraft Club of Peoria, c/o Leslie Lord, 505 E. Armstrong Street, Peoria
Aeronautical Society of the University of Illinois, Urbana, R. Watts, Sec., 507 E. John Street, Champaigne

INDIANA.

Purdue Aero Club, Purdue University, Lafayette
South Bend Aero Club, South Bend.
*Aero Club of Indiana, Indianapolis

KANSAS.

Aero Club of Topeka, Topeka
*Western Aero Association, E. S. Cole, Sec., Topeka
Kansas State Aero Club, C. H. Lyons, Sec., Overland Park

KENTUCKY.

Continental Aero Club, Richmind

LOUISIANA.

Southern Aero Club, 809 Canal Street, New Orleans
New Orleans Aero Club, Wm. Allen, Sec., New Orleans

MARYLAND.

*Aero Club of Baltimore, Col. Jerome H. Joyce, Pres., Baltimore

MASSACHUSETTS.

Aero Club of North Adams, North Adams
*Aero Club of New England, A. R. Shrigley, Sec., 26 Tremont St., Boston
Amherst Aero Club, Amherst
Springfield Aero Club, c/o Charles T. Shean, Pres., 3 John Street, Springfield
*Harvard Aeronautical Society, Prof. A. Lawrence Rotch, Pres., Blue Hill Observatory
Mass. Inst. of Technology Aero Club, John S. Selfridgem, Sec., Inst. of Technology, Boston
Dartmouth Aero Club, Richard F. Paul, Sec., Dartmouth
First Assn. of Licensed Pilots, Chas. J. Glidden, Pres., Hotel Somerset, Boston
Williams Aeronautical Society, Williams College, Robert O. Starret, Sec., Williamstown

MICHIGAN.

*Aero Club of Michigan, C. B. du Charme, Sec., Detroit
University of Michigan Aero Club, Ann Arbor

MINNESOTA.

Minneapolis Junior Aero Club, Stillman Chase, Sec., 3047 5th Avenue, S., Minneapolis
St. Louis Experimental Ass'n., 5346 Zealand Street, St. Louis
*Kansas City Aero Club, George M. Myers, Pres., Convention Hall, Kansas City

MISSOURI.

*Aero Club of St. Louis, 1429 Pine Street, St. Louis.

MONTANA.

Aero Club of St. Charles College, Helena

NEBRASKA.

Aero Club of Nebraska, Col. Wm. H. Glassford, Pres., Fort Omaha
Junior Aero Club or the Y.M.C.A., c/o Y.M.C.A., Omaha
Lincoln Aero Club, Lincoln, c/o G. R. Brownfield, 1234 "O" Street
Aviation Club of Nebraska, Arthur Freuzer, Sec., 2778 California Street, Omaha

NEW JERSEY.

Princeton University Aero Club, Princeton
Aeronautic Society of New Jersey, c/o N. J. Automobile & Motor Club, Broad Street, Newark
Aero Club of New Jersey, c/o James K. Duffy, Sec., 315 Madison Avenue, New York
New Jersey Aeronautical League, W. A. Kraus, Sec., Guttenberg
Aero and Motor Club, Asbury Park
Atlantic City Aero Club, Col. Walter E. Edge, Sec., Atlantic City
Model School Aero Club, Trenton, R. G. Tenvitt, Sec.
Trenton Aero Club, James Fenton, Sec., Trenton

NEW YORK.

*Aero Club of America, 297 Madison Avenue, Chas. Walsh, Sec.
The Aeronautical Society, 250 W. 54th Street, Arnold Kruckman, Gen. Sec.
Aeronautic Alumni Ass'n., c/o West Side Y.M.C.A., West 57th Street
New York Model Aero Club, Adrien Lacroix, Sec., 141 Lexington Avenue
National Model Aero Club, c/o A. Leo Stevens, 282 9th Avenue
Stuyvesant Aeronautic Society, 345 East 15th Street, Percey W. Pierce, Sec.
Columbia Aero Club, Columbia University, 116th Street
Dewitt Clinton High School Aero Club, 58th Street and 10th Avenue
*Aero Club of Buffalo, Lafayette Hotel, Buffalo, N.Y.
Thousand Islands Aero Club, c/o Dr. J. M. Gibbons, 168 Montague Street, Ithaca
Aeronautic Section, Technology Club, Syracuse
Boys' High School Aero Club, Henry St. Pieless, Sec., 815 Avenue, J., Brooklyn
*Rochester Aero Club, c/o L. J. Seely, 10 Culver Road, Rochester
Aero Club of the Y.M.C.A., Harold C. Carpenter, Pres., White Plains
Aero Club, Haliano, U.S.A., 135, West 12th Street, N.Y. Seventy-two members. C. Chiantelli, Sec.
Junior Aero Club, c/o A. E. Horn, Public School, 77 Park Avenue and 81th Street
Commerce Aero Club, 65 West 117th Street
*Aero Club of New York, Garden City.
Mechanics Aeronautical Ass'n., c/o H. H. Simms, 304 Cutler Building, Rochester
Aeronautical Research Club of the Y.M.C.A., H. C. Myers, Sec., Buffalo
Aero Club Italiano, Saverio A. Mascio, 403 Park Avenue
Aeronautical Society of Women, Miss Dorothy E. Ball, Sec., 250 West 54th Street

OHIO.

*Aero Club of Ohio, Canton
*Aero Club of Dayton, Dayton
International Aeroplane Club, Dayton
Cleveland Aero Club, C. J. Forbes, Sec., Hollanden Hotel, Cleveland

OREGON.

Portland Aero Club, E. Henry Wemme, Pres., Portland

PENNSYLVANIA.

Aviation Section, Professional Chauffeurs Ass'n. of America, 1933 Spring Gardens, Phil.
*Aero Club of Pennsylvania, Rev. Geo. S. Gassner, Sec., Betz Buildings, Phil.
Ben Franklin Aeronautical Ass'n., c/o Dr. T. Chalmers Fulton, 6th and Diamond Street, Phil.
Philadelphia Aeronautical Recreation Society, Dr. Thos. E. Eldridge, Pres., 1639 N. Broad Street, Phil.
Haverford College Aero Club, Haverford, Pa.
Swartmore College Aero Club, Swartmore, Pa.
Univ. of Penn. Aero Club, Univ. of Penn., Phil., Pa.
Aero Club of Carnegie, Tech. Schools, Pittsburg, Pa.
Intercollegiate Aeronautical Ass'n., Geo. A. Richardson, Pres., Univ. of Penn., Phil.
Pittsburg Aero Club, H. P. Haas, Sec., Magel Buildings, Pittsburg, Pa.

RHODE ISLAND.

Pawtucket Aero Club, Pawtucket
Rhode Island Aeronautical Society, Providence, John J. Long, Sec., c/o Brown University

TENNESSE.

Nashville Aero Club, Nashville, E. Fisher Coles, Sec.

TEXAS.

Dallas Aero Club, c/o Chamber of Commerce
San Antonio Aero Club, c/o Dr. Fred J. Fielding, 423 Hick's Buildings, San Antonio
South Western Aero Club, P.O. Box 821, Fort Worth
Texas Junior Aeronautical Ass'n., Hugh Dumas, Pres., Fort Worth

UTAH.

Aero Club of Utah, c/o L. R. Culver, 11 Eagle Block, Salt Lake City
Salt Lake City Aero Club, c/o Mr. Campbell, Walker Bank Buildings, Salt Lake City

VERMONT.

Aero Club of Vermont, Chas. T. Fairfield, Pres., c/o Rutland News, Rutland

VIRGINIA

University of Virginia Aero Club, Stanford Swin, Sec., University of Virginia
Virginia-Tennesse Aero Club, Bristol, Va-Tenn, C. W. Morey, Sec.

WASHINGTON.

Aero Club of Washington, 415 Union Trust Buildings, Washington D.C.
Aero Club of Seattle, c/o M. Robert Guggenheim, 511 Loman Buildings, Seattle
Walla Walla Aero Club, Walla Walla

WISCONSIN.

*Milwaukee Aero Club, Milwaukee, c/o Major Henry B. Hersey, Chief of the Weather Bureau, Milwaukee
Milwaukee Aeronautic Society, Pres., Sherman Brown, Manager of Davidson Theatre, Milwaukee

U. S. A. MILITARY AVIATION.

Military Aeroplanes.

In March, 1914, there were 15 aeroplanes and hydroplanes in service, and about 10 on order.

The machines are :—

1 *Wright B.*
2 *Wright C.*
2 *Wright D.*
1 *Curtiss D.*
2 *Curtiss E.*
2 *Curtiss H.*
1 *Burgess F.*
4 *Burgess H.*
1 *Wright.*
1 *Curtiss* tractor.
1 *Burgess* tractor.

They are mostly stationed at San Diego, Manila, Hawaii and San Antonio.

Naval Aeroplanes.

At the end of March, 1914, the naval force consisted of 10 seaplanes or flying boats (*Benoist, Burgess, Curtiss* and *Wright*), and 50 more were reported on order, with a view to one being supplied to each of the important warships.

AVIATORS.

(The numbers after any name is the number of the U. S. Aero Club certificate.)

Army.

Arnold, Lieut. H. H. (29)
Beck, P. Capt. (39)
*Brereton, Lt. L. H. (211)
Burge, Corp. V. S. (154)
Chandler, C. de F. Capt. (59)
Foulois, Lieut. (140)
Geiger, Lieut. H. (106)
Goodier, Lt. L. E. (200)
Graham, Lieut. H. (152)
Hennessy, Capt. F. R. (153)
Humphreys, Lieut.
*Kirtland, Lieut. R. C. (45)
*Lahm, Lieut. F. P. (2)
Love, Lieut. M. L. (155)
McCluskey, Lieut. J. W. (90)
McKay, Capt. G. W. (67)
*McLeary, Lieut. S. H. (210)
McManus, Lieut.
Milling, Lieut. (30)
Rodgers, J. Lieut. (48)
Sherman, Lieut. W. C. (151)
Winder, Lieut.-Col. C. B. (130)

Navy.

Herbster, Ens. (103)
Ellyson, Lieut. T. G. (28)
Rodgers, John, Lieut.
Towers, Lieut. J. H. (62)

Naval & Military

(Up to end of March, 1914).

†Bellinger, Lieut. P. N. L.
*Carberry, Lieut. J. E.
*Chapman, Lieut. G. S.
†Chevalier, Ensign G. de C.
Clark, Lieut. V. E.
†Cunningham, Lt. A. D.
*Dargue, Lieut. H. A.
Dodd, Lieut. T. F.
Foulens, Lieut. T. G.
Herbster, Ensign V. D.
*Le Roy Muller, Lt. H.
†McIlwain, Lieut. W. M.
Mustin, Lt.-Com. H. C.
Morrow, Lieut. J.
*Seydel, Lieut. F.
†Smith, Lieut. R. L.
*Taliaferro, Lieut. W. R.
*Willis, Lieut. R. H. (jr.)

* In possession of expert's aviation certificates.
† In possession of hydro-aeroplane certificates.

U. S. A. PRIVATE AVIATORS (to end of 1911).

(The number against any name is, unless otherwise stated, the Ae. C. America pilot certificate number. Only a few American aviators have bothered to obtain the Ae. Certificate. America produces a large number of aviators who fly for pleasure or exhibitions only and have not gone into competitions under International Rules. These consequently do not bother about certificates; but most of those recorded could easily obtain them, if they cared to try.)

Adams, Clarence
Adams, A. S. (215)
Alvarez, F.
Ambrose, Charles
Andrews, Thornwell
Apte, H. J.
Arndt, Edw. F.
Atwater, Mrs. I. J.
Atwater, W. B. (98)
Atwood, H. N. (33)
Baker, G. H.
Baldwin, Ivy
Baldwin, Capt. T. S. (7)
Barnett, A. E.
Baxton, Sam
Bates, M. F. (66)
Beachey, Hillery (89)
Beachey, Lincoln (27)
Beatty, G. W. (41)
Beckly, Wm. A.
Beers, W. C. (40)
Benoist, T. W.
Bergdoll, Louis, J.
Betton, Knid
Bishop, Cortland
Bleakley, W. H.
Boandette, A. B.
Bonney, G. T.
Bonette, C. C.
Bonney, L. W. (47)
Brackett, A. J.
Brewer, Roy
Brindley, O. A. (46)
Brinker, H. S.
Brodie, O. W. (135)
Brookins, W. R. (19)
Brown, H. H. (58)
Bumbaugh, Capt. G. L.
Burgess, W. Starling(136)
Burligh, Chas
Bush, J. F.
Butler, P. J.
Callon, J. L. (102)
Champion, Frank (86)
Christmas, Wm.
Cannon, Jack
Cline, W. F.
Coffyn, F. C. (26)
Cole, R.
Coleman, R. F.
Cook, W. B. (95)
Cooke, Henry C.
Cooke, F. G. (28)
Cooper, John D. (60)
Costello, A. B.
Contourier, C. (79)
Crewelson, W. H.
Cross, Redmond W. (35)
Crosby, R. W.
Cummings, J. A.
Curtiss, Glenn H. (1) & (Ae. C. F. 1)
Curzon, J. W.
DeGiers, C.
De Hart, D. C.
De Kor, F. (72)
Dennis, D. L.
Dixon, S. D.
Dougherty, E. S. (87)
Doyle, H. St.
Drew, A. (50)
Drexel, J. A. (8)
Durgan, W. E.
Dyott, M.
Eaton, Warren
Ecot, Robert G.
Eells, Fred.
Elton, Albert (75)
Engel, A. J.
Erickson, Louis, G.
Esboo, D.
Evans, W.
Ey, G.
Fish, Farnam (85)
Fortney, Lewis
Fowler, R. G.
Freeman, A. (84)
Fuchs, Joseph
Funk, T. B.
Gallaudet, E. F. (32)
Gaines, A. R.
Gantz, Saxe P.
Gardener, Hubbard G.
Garner, R. W.
Gaskell, Bud
Gratz, H. F.
Gray, George
Green, William, Dr.
Gregory, Donald
Greider, C.
Greider, J.
Gressier, Romaine
Guey, Ting Joe
Hadley, C. O.
Hall,
Hamilton, C. K. (12)
Hamilton, J. W.
Hamilton, Thos. W.
Hammond, Lee (34)
Harper
Harkness, R. S. (16)
Harmon, C. B. (6)
Hartman, A.
Haupt, Willie
Havens, Beckwith (127)
Hendrian, A.
Henning, J. C.
Henningsen, Fred
Heth, Eugene
Henry, R. St.
Hilliard, W. M. (Brit. Ae. C. 102)
Hills, H. V.
Hofer, W.
Hoff, Wm. H. (91)
Hoflake, Charles
Holden, J. J.
Holt, E. (63)
Hoover, Fred. (100)
Hoover, H. H.
Huddleston, E. D.
James, Stanley
Janicke, W.
Jannes, Anthony (80)
Jennings, J. C.
Jerwan, S. S. (54)
Johnson, Frank H.
Johnson, Walter E.(164)
Junel, August
Kaiser, H. (95)
Kellrey, H.
Kenmerle, Horace
Kennedy, F. M. (97)
Kiley, J. E.
Kimball, Wilbur R.
Klein, H. H.
Klocklea, J. G.
Korn, Edward
Krasting, Theodore
La Chapelle, Duval
Lambert, A. B. (61)
Lambreath, C. E.
Lapelat, N.
Laser, G. F.
Le Van, Howard
Lewis, S. C. (92)
Lewkowicz, Ladis
Lidstone, Ed. S.
Lillie, M. T. (73)
Lockwood, Chas.
Longfellow, B. W.
Lowe, Geo. H.
Loughead, A.
Longo, T.
Ludwig, Vandy
Maier
Manners, George
Mars, J. C. (11)
Martin, J. B.
Martin, G. L. (56)
Martin, J. V.
Massar, A. M.
Masson
Matalach, S. H.
Mattingley, O. A.
Maynard, Arthur
Mayo, Albert (99)
McCully, J. B. (94)
McCarty, James
McClellam
McCollum, W. C.
McCurdy, J. A. D. (18)
McGoey, Thomas
McNamara, Geo. E.
McManus, L.
McMahon, A. J.
Medrick, F. H.
Meyerhoffer, Orvar
Miller, Clinton R.
Moisant, Miss M. E. (44)
Morok, Chas. B.
Mourfield, Carl
Murias, De E. F. (38)
Murphy, T.
Murphy, Wm.
Neidmiller, Ed.
Nelson, N. B.
Nelson, Nels. T.
Ovington, E. L.
Page, P. W. (68)
Paine, S. B.
Paridon, Michael
Park, Henry
Paulding, Dwight
Paulhan, L. (3)
Pfiel, P.
Post, Augustus
Powes, H. W.
Prince, Norman (55)
Prentice,
Prospect, Louis
Prowse, C. O.
Raiche, Mrs. F.
Ragot, Louis
Reichert H. D. W. (82)
Remington, Earle
Reynolds, Dr. Percy, L.
Richter, J. (81)
Riggs, E.
Rout, Arthur R.
Robinson, H. (42)
Roehvig, B. F.
Rowe, F. E.
Russell, Geo.
Sackett, Harry
Sands, H. Hayden (Ae. C. F. 70)
Schafer, G. E.
Schmidt, G. S.
Schneider, Fred. P.
Schulz, G. C.
Schwartz, A.
Schwister, John
Scott, Miss B.
Seeman, J. R.
Seignor, H. A.
Seligman, J. (64)
Seymour, Joseph
Sellers, M. B.
Shelton, T.
Sherwood, Oliver, B.
Shneider, Fred.
Shoemaker, Chas. W. (93)
Sill, F.
Simmonds, O. G. (145)
Skinner, S. R.
Slaik, E.
Slavin, J. J.
Smith, A.
Smith, Kyle
Smith, R. M.
Sommerville, W. E.
Sorensen, Prof.
Sparling, J. N.
Steitz, F. M. (88)
Stewart, J. G.
Stone, A. (Ae. C. F. 15)
Summer, Gill.
Suppe,
Talmage, M. P.
Takisow,
Tarbo, J.
Thomas, W. T.
Thomas, O. W.
Thompson, George
Tickell, Sam
Timothy, S. H.
Troxey
Turpin, J. C. (22)
Tuttle, T. T.
Vanderbilt, W. K.
Vaughan, Stanley
Vogt, Jesse S.
Walden, Dr. H. W. (74)
Walker, Clarence
Ward, J. J. (52)
Warner, A. P.
Webster, C. L. (69)
Weeks, F. W.
Wells, G.
Wetzig, H. H.
Weymann, Charles (14)
Wilcox
Wildman, Dock
Willard, C. F. (10)
Williams, Beryl (71)
Williams, B. J.
Willoughby, Capt. Hugh L.
Wilson, Edward
Wiseman, Fred. E.
Witmer, C. C. (53)
Worden, John H. (76)
Wright, Orville (4) (Ae. C. F. 14)
Wright, Wilbur (5) (Ae. C. F. 15)
Young, C. M.
Yan, J.

The following American aviators have been killed :—

1908.
Selfridge, Lt. (Army)

1910.
Johnstone, R. (20)
Moisant, J. B. (13)

1911.
Badger, Wm. R. (36)
Castellane, Tony
Clark, U. B., Dr.
Dixon, Cromwell (43)
Ely, Eugene
Frisbie, J. J. (24)
Ruxsey, Arch. (21)
Johnston, St. Croix
Kelly, Lieut. (Army)
Kreamer, Dan. A.
Miller, F. H.
Oxley
Penot, Marcel
Purvis, Wm. G.
Rosenbaum, Louis
Schriver, Tod (9)

(Note.—1912, see next page.

U. S. A. PRIVATE AVIATORS.

Brevets, **1912.**

Ahlasoro, J. P. (217)
Aldasaro, E. A. (218)
Andrews, W. D. (124)
Arnold, G. (198)
Barlow, F. E. (139)
Beckwith, S. F. (137)
Beech, A. C. (168)
Belcher, O. T. (158)
Bell, Dr. F. J. (196)
Bell, G. E. (201)
Bergdoll, G. C. (169)
Berlin, C. A. (169)
Bleakley, W. H. (206)
Boulduc, W. (157)
Boyskorfer, C. (193)
Brown, R. M. (185)
Bryant, G. M. (208)
Burnside, F. H. (212)
Carleton, O. G. (145)
Colovos, P. (160)
Crossley, S. J. (187)
Dalwigk, G. B. (190)
De Hart, D.C. (129)
Eaton, W. S. (128)
Edelman, D. (191)
Elliott, R. (178)
Fugelmeny, H. (203)
Fritts, E. V. (213)
Gilpatric, J. G. (171)
Gray, G. A. (142)
Gray, J. F. (150)
Gunn, T. (131)
Hattemer, H. L. (147)
Hemstraught, W. H. (146)
Hetlick, W. A., jr. (197)
Hild, F. C., (216)
Hunt, E. N. (163)
Holmes, H. (204)
Johnson, R. R. (205)
Kalbitzke, W. (126)
Kaminski, J. G. (121)
Kemper, F. W. (119)
Klockler, J. G. (125)
Korn, E. (171)
Lankey, W. A. (183)
Law, R. B. (188)
Maroney, T. T. (106)
Masson, D. (202)
McMillen, R. E. (111)
Meyer, C. (170)
Miller, L. A. (173)
Niles, C. F. (181)
Park, H. (113)
Peoli, C. (141)
Pfeiller, W. (116)
Prodgers, C. B. (159)
Reid, M. E. (114)
Reid, P. H. (179)
Renner, L. R. de (115)
Richardson, R. H. C. (174)
Robinson, R. W. C. (162)
Ruiz, H. (182)
Russell, R. R. (132)
Salinas, A. (170)
Salinas, G. (172)
Schaeffer, J. S. (177)
Schulovinck, E. (135)
Schuman, F. J. (143)
Singh, M. M. (123)
Sjolander, C. T. (138)
Smith, J. F. (207)
Spaulding, J. D. (107)
Stark, W. M. (110)
Stinson, K. (148)
Sverkersvick, A. S. (180)
Tait, G. M. (184)
Takeiski, K. (122)
Terrill, F. J. (108)
Thomson, C. (117)
Thompson, De L. (134)
Twombly, W. L. (149)
Vought, C. M. (156)
Waite, H. R. (186)
Weeks, E. O. (214)
Weiner, T. (167)
Wiggins, C. L. (175)
Wood, C. M. (200)

Up to end of March, **1914.**

Adams, B. H.
†Bass, E. C.
Bergenthal, K. A.
Bixler, J. A.
Blasiar, A.
Bolognesi, A.
Bonnet, L. W.
Bouldin, E. W.
Bowerson, W. E.
Bressmann, A. A.
Brown, L. E.
Brubaker, A. J.
Castori, F.
Cooke, W. B.
Crowell, H. R.
Dalwigk, W. B.
Dekor, F.
De Lopd, T.
†Doherty, W. E.
Elton, A.
Fish, E. T.
Fisher, C. E.
Freeman, A.
Frits, E. A.
Gaines, A. B.
De Giers, C. A.
De Hart, D. C.
†Harris, H. P.
Hattemer, H. L.
Heine, A. T.
Henrick, J. S.
Henstrought, W. H.
Hetlich, J. W.
Hild, F. C.
Hill, J. D.
Hill, T. J.
Holt, L. E.
Hornsby, Mrs. R.
Huhl, C. T.
Hunt, E. N.
Hutchinson, J. R.
Johnson, R. R.
Johnson, W. E.
Kaminski, J. C.
Kabitzke, W.
Keuting, H. S.
Kemper, F. W.
Klocker, J. G.
Lahm, W. A.
Law, R. B.
Lorain, A. W.
*Macaulay, T. C.
†Mac Gorgon, S.
*Mc Culloch, D. H.
McGuire, N. M.
Mars, J. C.
Martin, W. K.
Marusky, R. F.
†Morris, R. V.
Murias, F. de F.
Nannini, D.
Norman, L. E.
Ocker, W. C.
Olivier, E.
Page, G. A.
Page, R.
Park, J. D.
Penhayn, J. P.
Petersen, C. J.
Priest, M. R.
Primm, M. W.
Prodgers, C. B.
Puffea, G.
Rawson, G. A.
Reichert, H. F.
Reid, M. E.
De Renner, L. H.
Rich, C. P.
Richardson, H. C.
Riddell, J. A.
Rinehart, H. M.
Ritche, J. A.
Robinson, W. C.
Ross, T. M
Roystone, C. C.
Ruiz, H.
Saint-Henry, R. C.
Schaap, C. J.
Schermerhorn, M. T.
Seidell, F. B.
Seligmann, J.
Sestak, R. G.
Shoemaker, G. W.
Smith, A. R.
Sperry, L. B.
Steele, W. E.
Stiles, F. M.
Strong, G. R.
Stroud, L. O.
Turpin, J. C.
Underwood, C. E.
Utter, C. E.
†Vilas, S. A.
Walb, W.
Walsh, C. F.
Webster, H. J.
Whelan, B. L.
Wright, B. M.
Zimmerman, C. L.

* In possession of expert's aviation certificates.
† In possession of hydro-aeroplane certificates

U.S. Aviators killed:
Continued.

1912.
Blair, R.
Chambers, W. B.
Clarke, J. (133)
Gill, H. W. (51)
Hazelhurst, Lieut.
Kearney, H. F. (83)
Konslo, M. (120)
Lawrence, C.
Longstaffe, J. L.
Mitchell, L. (51)
Page, R. (90)
Parmelee (25)
Peck, P. (57)
Quinby, Miss H. (57)
Rodgers, C. P. (49)
Rockwell, Lt. L. C. (165)
Scott, Corp. F.
Southard, F. J.
Stevenson, J.
Turner, H.
Underwood, G.
Walsh, C. F.
Welsh, A. L. (23)

1913.
Bell, G.
Billingsley, Ensign
Boland, F. E.
Bryant
Call, Lieut.
Chandler, Lieut. R.
Colovan, J.
Drew, A.
Ellington, Lieut. E. L.
Gardner, F. F.
Kelly, Lieut. H. M.
Kerns, T.
Lillie, Max
Love, Lieut.
Rich, Lieut. C. P.
Roche, H. de la
Sandt, E.
Schmidt, G.
Park, Lieut. T. D.

1914.
Hamilton, C. K.
Jewell, A. J.
Murray, Lieut.
Ness, P. V.
Post, St. H. B.
Roystone, C. C.
Rich, E. G.

A

AERIAL EXHIBITION Co. (Biplane), 1777, Broadway, New York. Built a *Curtiss* type with Kirkham motor, 1911. 2 skids, with wheel between, and usual *Farman* rubber shock absorbers.

AERIAL YACHT CO., San Francisco. Inc. 1913. Capital, $25,000.

AERONAUTICAL SUPPLY CO. See *Cordeaux-Etter.*

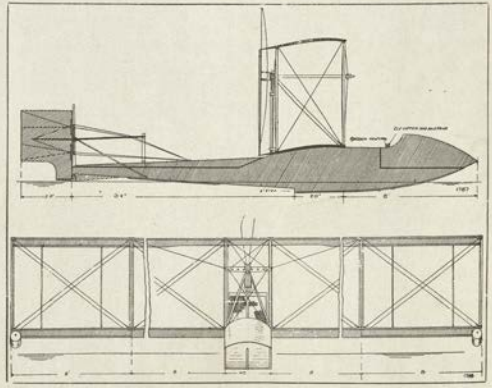
AMERICAN AEROPLANE SUPPLY HOUSE (Monoplane), 266, Main Street, Hempstead, N.Y. Builders of monoplanes after the *Bleriot* type. Half-a-dozen machines were built and sold during 1911. Fitted with Gnomes or American engines.

B—*continued.*

BENOIST. Benoist Aircraft Co., 6628, Delmar Boulevard, St. Louis, Mo. (formerly Aeronautic Supply Co.)

	Type XIV Air-Boat.		
Length ... ... feet (m.)	23 *7·01*		
Span ... ... feet (m.)	35½ *10·75*		
Area ... ... sq. feet (m².)	...		
Weight ... { total ... lbs. (kgs.)	700 *318*		
{ useful ... lbs. (kgs.)	...		
Motor ... ... h.p.	75 Roberts or 70 Sturtevant		
Speed ... { max. m.p.h. (km.)	...		
{ min. m.p.h. (km.)	...		

Notes.—The boat of the flying boat is 23½ feet long, by 2 feet 2¼ inches wide. Shipable wheels. The hull of this boat is 22 inches high at the step.



BENOIST flying boat. *By favour of "Aeronautics."*

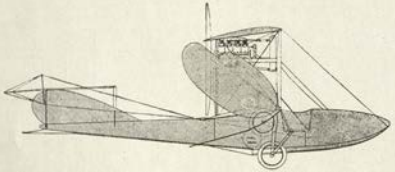
B—*continued.*

BOLAND. Aeromarine Plane & Motor Co., Avondale, N.J. Factory at Nutley, N.J.

Model and date.	Flying boat 1914.		
Length ... ... feet (m.)	...		
Span ... ... feet (m.)	...		
Area ... ... sq. feet (m^2.)	...		
Weight ... total ...lbs. (kgs.)	2900	997	
... useful ...lbs. (kgs.)	...		
Motor ... ... h.p.	Boland		
Speed ... ... m.p.h. (km.)	...		
Number built during 1912 ...	...		

A refinement of the original machine of the late F. E. Boland, which first flew in 1911. *Control* by two special jibs which work inward. Designed to be used also as a hydro, with three step floats. No rudder or ailerons.

Notes.—Hull: Length p.p., 24¼ inch (7·31); *over all*, 26½ inch (7·99); Beam, 41½ inch (1·26); Depth, 42 inch (1·52).

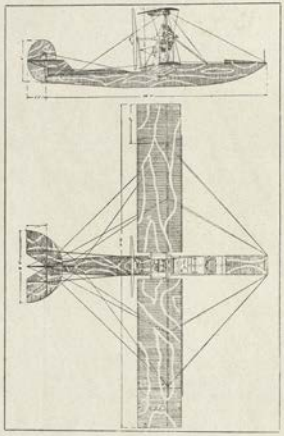


Aeromarine Plane & Motor Co. flying boat. *By favour of "Aeronautics."*

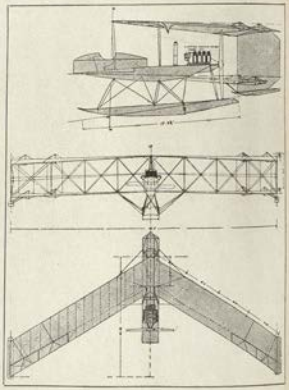
B—*continued.*

BURGESS. Burgess Co. & Curtis, Marblehead, Mass. Built *Wright* types under license, also machines of their own.

Model and date.	Coast defence hydro **1913.**	Naval flying boat. **1913.**	Hydroplane. **1914.**	Flying boat. **1914.**
Length ... feet (m.)	33½ *9·55*	31 *9·45*	24½ *7·43*	41½ ...
Span ... ... feet (m.)	37¾ *12*	43 *13·10* 36 *10·97*	47 *14·32*	30½ ...
Area ... ... sq. feet (m².)	...	397 *37*	...	...
Weight { total ...lbs. (kgs.)	...	...	1450 *658*	...
Weight { useful ...lbs. (kgs.)	775 *352*	...	...	...
Motor ... ... h.p.	60 Sturtevant *muffled*	70 Renault	100 O-X Curtiss	220 Anzani
Speed ... ... m.p.h. (km.)	59 *95*	...	55 *85*	75 *120*
Endurance ... ... hrs.	4½	...	...	...
Remarks.—	Special clear view for observation. 2—1 step mahogany and copper floats. Useful weight includes floats. Details *Aeronautics*, (U.S.A.), Feb., 1913.	Boat 29½ feet long. 2—2 step floats. Petrol, 48 gallons.		



Burgess 220 h.p. flying boat. *By favour of "Aeronautics."*



Burgess-Dunne hydro. *By favour of "Aeronautics"*

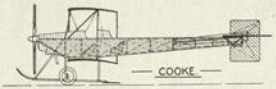
C

CHRISTMAS. Durham Christmas Aeroplane Sales and Exhibition Corporation, Inc. 1913. Capital: $10,000 to $50,000. Claims for it are that it is "automatically balanced." This is attained by the shape of the machine, not through the agency of any auxiliary apparatus.

COOKE. Weldon B. Cooke Aeroplane Co., Sandusky, Ohio. Founded 1913 by the well-known aviator, W. B. Cooke.

Model and date.	1913.	
Length ... ... feet (m.)	25	7·60
Span ... ... feet (m.)	24	7·30
Area ... ... sq. feet (m²)	240	22
Weight ... { total ...lbs. (kgs.)	750	340
{ useful ...lbs. (kgs.)	...	
Motor ... ... h.p.	75 Roberts 2 cycle *upside down*	
Speed ... ... m.p.h. (km.)	...	
Number built during 1912 ...	new firm	

Details, *Aeronautics*, U.S.A., February, 1913.



C—*continued.*

CURTISS. Curtiss Aeroplane Co., Hammondsport, N.Y. Glenn H. Curtiss in 1907 and 1908 was a member of the Aerial Experiment Association, formed by Dr. and Mrs. Alexander Graham Bell. This Association built four machines, each along the lines of one of the four engineers belonging to the Association, F. W. Baldwin, Lieut. T. E. Selfridge, G. H. Curtiss and J. A. D. McCurdy. The last built was the *June Bug*, designed by Curtiss and was the most successful. In the spring of 1908, the Association was disbanded and The Aeronautical Society gave Curtiss an order for an aeroplane with *carte blanche* as to design. He produced a 4 cyl. machine, Curtiss engine, and flew it. A duplicate was hurriedly built, 8 cyl. engine installed, and taken to Europe for the first Gordon Bennett, which he won. Returning, the same type was continued with minor improvements. Later the front elevator was brought closer in, finally discarded, and the fan tail adopted and this remains the standard land machine to-day. In April, a military tractor was built and flown.

On January 26th, 1911, first successful flights were made with a hydro-aeroplane, at the Winter camp at San Diego, Calif. This had two floats tandem. One was finally adopted and great success was achieved, and remains standard at the present time. With this machine various experiments were made. It was altered in a tractor for one occasion, it was lifted on board warships; made into triplane, etc.

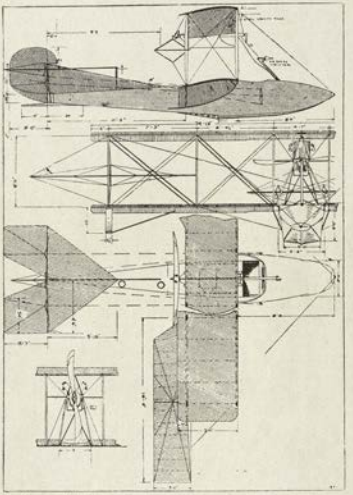
In 1912 he brought out his present type of flying boat. This is being rapidly developed and minor changes in details are made in practically every machine put out.

In May, 1913, he produced a special 4-passenger flying boat for a customer on special order.

Note.—In addition to those tabulated, special small racing machines have been built, as well as similar machines with extra sections simply added either side for Army use.

Model and date.	Military Tractor.	Mono Flying boat.
Length ... ... feet (m.)	25 7·61	22 6·70
Span ... ... feet (m.)	...	30 10·19
Overall ... ... feet (m.)	...	36 11·43
Area ... ... sq. feet (m²)	...	...
Weight ... { total ...lbs. (kgs.)	...	...
{ useful...lbs. (kgs.)	...	...
Motor ... ... h.p.	90-100 O-X Curtiss	O-X Curtiss
Speed ... ... m.p.h. (km.)	...	...

Remarks.—This flying boat has new double Vee type bottom. Total spread of wings from tip to tip of ailerons is 34 feet. Spread of supporting surface is 28 feet.



Curtiss flying boat. *By favour of "Aeronautics."*

K

KIRKHAM Biplanes. Chas. B. Kirkham, Motor Manufacturers, Savona, N.Y. Began to manufacture aeroplanes in 1912, after previous experiments and flights near his factory.

Length. feet } **span,** 34 feet } **surface,** sq. feet }
m. } 10·40 m. } m². }

Weight.—Complete, *without pilot*, 980 lbs. (445 kgs.)

Motor.—50 h.p. Kirkham, located in front under bonnet. 70 h.p. also fitted.

Speed.—56-62 m.p.h. (90-100 k.p.h.)

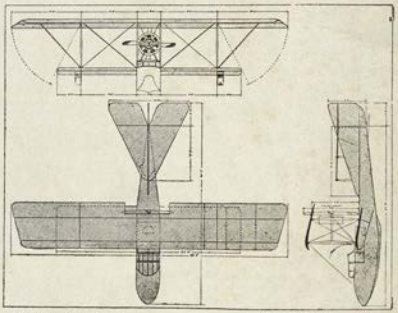
Remarks.—Rises easily at under 35 m.p.h., and has a full speed radius of 5½ hours. Full details in *Aeronautics*, U.S.A., January, 1912.

S

SELLERS. Quadruplane. Matthew B. Sellers, B.F., D2, Norwood, Ga. Has been successfully experimenting for a number of years with a staggered quadruplane, and has given the aviation world a number of valuable papers. His aim is to fly successfully with the least possible horse power. For several years he has been making flights with various engines delivering from 5 to 6 h.p. on careful test. The actual thrust has been measured and recorded in late 1911 experiments. Details in *Aeronautics*, June, 1909; October, 1909; November, 1910; January, 1911; January, 1912. No actual details of the machine are available, but it follows closely the patent drawings (see references). He is one of the few real scientific flying men in the U.S.A. The original machine with slight changes was still flying at end of 1912 with only 5 h.p. B.H.P. The flying speed is 20 m.p.h.

SLOANE. Sloane Aeroplane Co., New York.

Model.	Flying boat Speed scout.	Sea scout.	Sporting type.
Length ... ... feet (m.)	26 7·92	26 7·92	26 7·92
Span ... ... feet (m.)	36 10·97	36 10·97	36 10·97
Area ... ... sq. feet (m².)	310 27	405 37	310 27
Weight (total ... lbs. (kgs.)	...	...	...
Weight (useful ... lbs. (kgs.)	...	...	...
Motor... ... ... h.p.	130 Salmson	80-100 Gnome	80-100 Gnome
Speed... ... m.p.h. (km.)	...	...	...



SLOANE. Flying boat. *By favour of "Aeronautics."*

T

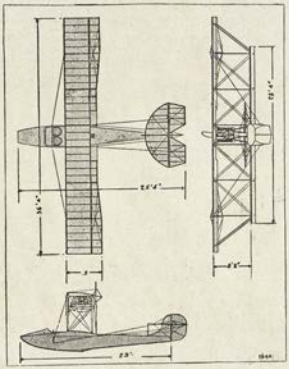
THOMAS Biplanes. Thomas Bros., Bath, N.Y., O.W., and W.T. Thomas began experimenting and flying in 1908 with a machine on the order of a *Curtiss*. In the winter of 1909-10, a type of their own was produced and was flown during 1911 by Walter Johnson in exhibitions. In 1912 they continued the same type, with refinements. In 1913 they adopted the overhanging top plane type, but of the same general high order of construction.

Model and date.		Flying boat 1914.	
Length ... ... feet (m.)		25½	*7·68*
Span	lower plane feet (m.)	36½	*11·00*
	top plane feet (m.)	28½	*8·53*
Area ... sq. feet (m²)		...	
Weight	total ...lbs. (kgs.)	1275	*579*
	useful lbs. (kgs.)	...	
Motor ... ...h.p.		90 Austro-Daimler	
Speed ... m.p.h. (km).		65	*105*
Endurance ... ... hrs.		...	

Remarks.—Control in all: Ailerons, 4 rudders. Elevator operated by rocking post on which wheel is mounted. The 1912 tractor was given up as less efficient than the Standard 1913. Special: full description *Aeronautics*, U.S.A., May, 1913.

The move was evolved 1912, but not built till well into 1913.

Length of hull 23 feet, beam 34½ inches at bottom and 40 inches at top.

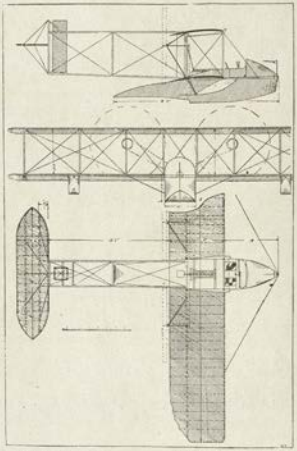


1914 Thomas flying boat. *By favour of "Aeronautics."*

W

WRIGHT BROS. Biplanes. The Wright Co., Dayton, Ohio. The original type of *Wright* machine was mounted on skids only, and started along a rail. Its special features were a biplane elevator forward, main planes with warpable tips to trailing edge, small keel in gap, 2 propellers, chain driven in rear of planes, double rudder in rear and no tail. Wilbur Wright flew a machine of this type for 2 h. 20 m. 23⅘ s. in 1908. (Details of early *Wrights* see previous editions of this book.)

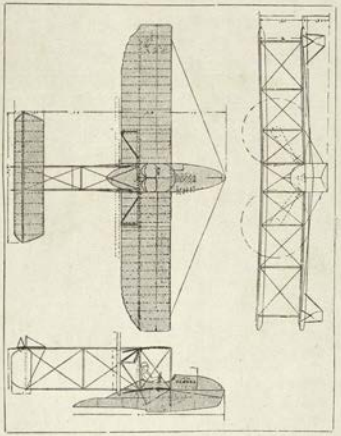
Model and date.	Aeroboat. G.	Aeroboat. C.	CH.	E.
Length ... ... feet (m)	...	...	...	...
Span ... ... feet (m)	...	...	38 *11·58*	32 *9·75*
Area ... ...sq. feet (m²)	...	...	...	...
Weight ... total ...lbs. (kgs.)	1300 *590*	1200 *545*	920 *417*	730 *331*
Weight ... useful lbs. (kgs.)	...	...	440 *200*	...
Motor ... ... h.p.	60 Wright	60 Wright	60 Wright	30 or 50 Wright
Speed max. m.p.h. (km.)	60 *95*	...	...	...
Speed min. m.p.h. (km.)	40 *65*	...	...	...



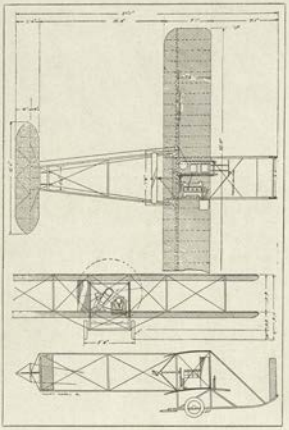
WRIGHT. Model G. *By favour of "Aeronautics"*

[Continued next page.

WRIGHT.—*continued.*



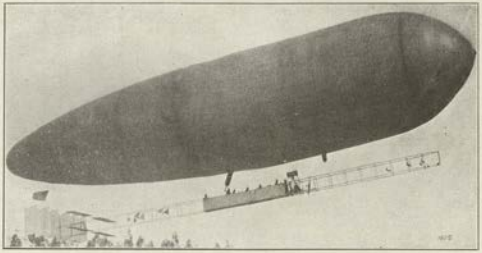
WRIGHT flying boat. *By favour of "Aeronautics."*



WRIGHT. Model E. *By favour of "Aeronautics."*

U.S.A. DIRIGIBLES.

KNABENSHUE. (1913).

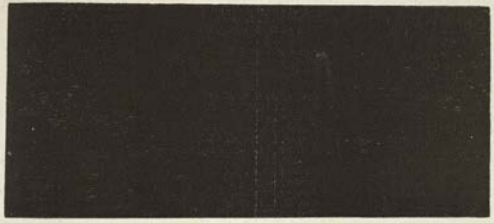


Length.—150 feet.
Capacity.—2,000 c. feet.
Propellers.—Two *Wright*.
Speed.—30 miles an hour.
Motor.—30 h.p.

GENERAL ADDENDA AND ERRATA TO AIRCRAFT PAGES.

BRITISH MILITARY AVIATION.

Army Wing Royal Flying Corps, Aeroplane Section.



Squadron Commanders.

Brooke-Popham, Capt. H.R.M.(108)
Burke, Capt. C.J. (146) (Ae.C.F.200)
Carden, Lt. A. D. (239)
Cook, Lt.-Col. H. R. (42)
Fulton, Major J. D. B. (27)
Musgrove, Capt. H.
Raleigh, Capt. G. H. (196)
Trenchard, Major H. M. (270)

Since added on promotion.

Becke, Major J. H. W.
Longcroft, Bt. Major
Higgins, Major J. F. A.
Salmond, Major J. M.
Webb-Bowen, Capt. T. I.

Flight Commanders.

Allen, Capt. C. R. W. (159)
Beor, Lt. B. R. W. (R.A.) (185)
Connor, Lt. D. G. (54)
Fox, Lt. A. G. (176)
Longcroft, Lt. C. A. H. (102)
Reynolds, Lt. H. R. P. (R.E.)

Since added on promotion.

Board, Capt. A. G. S.
Bourke, Capt. E.
Brabazon, Major
Charlton, Capt. L.
Carmichael, Lt. G. I.
Cholmondeley, Lt. R.
Dawes, Capt. G. W. P.
Harvey, Lt. E. G.
Herbert, Capt. P. L. W.
Holt, Lt. F. V.
McLean, Capt. A. C. H.
Picton-Warlow, Capt. W.
Shepherd, Capt. G. S.
Soames, Lt. A. H. L.
Todd, Capt. G. E.

Flying Officers.

Abercrombie, 2nd Lt. R. O. (134)
Allen, Lt. D. L. (318)
Anderson, Lt. E. V. (247)
Atkinson, Lt. K. P. (267)
Barrington-Kennett, Lt. B. H. (Adjutant) (43)
Beatty, Capt. W. D. (89)
Birch, Lt. W. C. K. (375)
Boyle, Lt. the Hon. D. G.
Burchardt-Ashton, Lt. A. E.
Burroughs, Lt. J. E. G.
Chinnery, Lt. E. F. (211)
Christie, Lt. A. (R.A.) (245)
Conran, Lt. E. L. (342)
Corbalis, Lt. E. R. L.
Darbyshire, Capt. C. (257)
Dawes, Lt. L. (228)
Gill, Lt. N. J. (174)
Glanville, Lt. H. F. (307)
Gould, 2nd Lt. C. G. S. (288)
Harvey-Kelley, Lt. H. D.
Hubbard, 2nd Lt. T. O. B. (202)
Hynes, Lt. G. B. (R.A.) (40)
James, Lt. B. T.
Joubert, de la F. Lt. P. B. (280)
Lawrence, Lt. W.
MacDonnell, Capt. H. C. (273)
Mapplebeck, Lt. G. W. C. (386)
Martyn, Lt. R. B.
Mead, Sergt. J. (475)
Mellor, Capt. C. (155)
Mills, Lt. R. P. (377)
Moss, Bt.-Major L. B. (241)
Mulcahy-Morgan, Lt. T. W.
Noel, Lt. M. W. (416)
Pepper, Lt. J. W. (98)
Playfair, 2nd Lt. P. H. L. (285)
Pretyman, Lt. G. F. (341)
Porter, Lt. G. T. (R.A.) (109)
Pyne, Hon. Lt. W. J. D. (Qr.-mr.)
Read, Lt. A. M. (336)
Rodwell, Lt. R. M.
Roupell, 2nd Lt. N. S. (237)
Small, Lt. F. G. D. (429)
Small, Lt. R. G. (343)
Smith-Barry, 2nd Lt. R. R. (161)
Stopford, Lt. G. B.
Thompson, Lt. A. B.
Tucker, Capt. F. St. G.
Vaughan, 2nd Lt. R. M.
Wadham, 2nd Lt. V. H. N. (243)
Wanklyn, Lt. F. A. (284)

Since added.

Barton, Lt. R. J. F.
Birch, Lieut. W. C. K.
Borton, Lt. A. E.
Brock, Lt. H. le M.
Cogan, Lt. F. J. L.
Freeman, Lt. W. R.
Fuller, 2nd Lt. E. N.
Grey, Capt. R.
Hartree, 2nd Lt. A.
Harvey-Kelly, Lt. H. D.
Hosking, Lt. C. G.
Humphreys, 2nd Lt. G. N.
Lewis, Lt. D. S.
Lewis, Lt. R. E.
Mapplebeck, Lt. G. W.
Mansfield, Lt. W. H. C.
Marsh, Lt. A. C. E.
Mitchell, Lt. W. G. S.
Noel, Lt.N. W.
Pennefeakell, Lt. L. da C.
Pretyman, 2nd Lt. G. F.
Read, Lt. W. R.
Roche, Lt. H. J. A.
Shekleton, Lt. A.
Small, Lt. R. G. D.
Spence, Lt. C. B.
Stodart, Lt. R. G. D.
Vaughan, Lt. R.M.
Wilson, 2nd Lt. C. W.

GENERAL ADDENDA AND ERRATA TO AIRCRAFT PAGES.—*continued.*

BRITISH MILITARY AVIATION.

Reserve (Flying Officers).

Ashmore, Major E. B. (281)
Bell, 2nd Lt. C. G. (109)
De Havilland, 2nd Lt. G. (55)
Henderson, Col. D. (118)
Marks, Lt. C. H. (83)

Pizey, 2nd Lt. C. P. (61)
Salmond, Capt. W. G. H.
Smith, Lt. S. C. W.
Unwin, Lt. E. F.
Warter, 2nd Lt. H. de V. (107)

Since added.

Barrington-Kennett, 2nd Lt. V. A.
Boger, Capt. R. A.
Boyd-Moss, Bt. Major L. B. S.
Brancker, Major W. S.
Bryan, 2nd Lt. L. A.
Cook, Lt. Col. H. R.
Darbyshire, Capt. C.
Dobie, 2nd Lt. W. F. R.
Dowding, Capt. H. C. T.
Forman, Major A. R.
Fulton, Major J. D. R.
Ellington, Capt. E. L.

Griffith, Capt. G. M.
Hooper, Lt. A. F. A.
MacDonnell, Capt. H. C.
MacNeece, Lt. W. F.
Metford, 2nd Lt. H. C.
Perry, 2nd Lt. E. W. C.
Spratt, 2nd Lt. N. C.
Smith-Barry, 2nd Lt. R. A.
Stopford, Lt. G. B.
Tucker, Capt. F. St. G.
Ware, 2nd Lt. D. C.
Worthington-Wilmer, Lt. H. F. M.

Special Reserve. (*2nd Lieuts. on probation.*)

Bland, H. C., de la F. (218)
Busteed, H. R. (194)
Charteris, R. L. (197)
Cutler, H. D. (189)
Davies, E. K. (22)
Fuller, H. C. (Ae. C. F.)
Gibson, W. E. (129)
Hammond, J. J. (32)
Humphreys, G. N. (390)

Lerwill, F. W. H.
Metford, L. S. (146)
Perry, E. W. C. (130)
Richards, G. B. (400)
Sippe, S. V. (172)
Spratt, N. C. (339)
Ware, D. C.
Wilson, C. D. (Ae. C. F. 156)
Young, D. G. (207)

Since added.

Adams, F. P.
Baumann, E. B.
Blake, M. B.
Cockerell, S. P.
Hardman, W. L.
Howell, O. B.

Joubert, de la F.
Paterson, R. R. O.
Payze, A.
Russell, A. L.
Strange, L. A.
Thomson, A. A. B.

The following have qualified privately, R. Ae. C. brevets, and are employed in the various :—

1910.

Gibb, Lt. (10)
Snowden Smith, Lt. (29)
Watkins, Lt. H. E. (25)
Wood, Capt. H. F. (37)

1911.

Blacker, Lt. (12)
Cross, Lt. (151)
Dickson, Capt. (Ae. C. F. 260)
Harford, Lt. (152)
Harrison, Capt. (158)
Hoare, Capt. (126)
Hooper, Lt. (149)
Hutchinson, Capt. Steele (143)
Maunsty, Lt. G. (155)
Pitcher, Capt. (125)
Sebag-Montefiore, Lt. (93)
Smeaton, Lt.-Col. (115)
Strover, Lt. E. J. (145)

1912.

Agnew, Capt. C. H. (240)
Alston, Capt. R. C. W. (255)
Ashton, Lt. A. E. B. (201)
Bannerman, Major Sir A. (213)
Boger, Capt. R. (335)
Borton, Lt. A. E. (170)
Boyle, Capt. M. (241)
Brodigan, Lt. F. J. (200)
Broke-Smith, Capt. D. W. (204)
Bulkeley, Lt. H. T. (246)
Carfrae, Lt. G. T. (188)
Chamier, Capt. J. A. (340)
Cordner, Capt. R. H. L. (277)
Ellington, Capt. E. L. (305)
Empson, Lt. J. (387)
Fielding, L. H. C. (212)
Fletcher, Lt. (229)
Hanlon, Lt. D. R. (311)
Jones, Lt. B. T. (230)
Lewis, Lt. D. (216)
Mackay, Lt. M. E. (177)
Mackworth, Lt. J. D. (209)
Martin-Barry, Lt. (Ae C. F.)
McCudden, Capt. J. H. (269)
Miller, Capt. G. R. (313)
Murray, Lt. R. G. H. (328)
Nicholas, Capt. C. P. (266)
Percival, Lt. D. (226)
Pollok, Lt. R. V. (379)
Powell, Capt. D. W. (380)
Price, Capt. C. L. (299)
Rawson, Lt. K. (249)
Reilly, Lt. H. L. (252)
Ridd, Corporal F. (227)
Roger, Capt. R. (335)
Stott, Capt. J. N. J. (373)
Styles, Lt. F. E. (338)
Thomas, Staff-Sergt. (276)
Trevenen, Lt. R. J. (230)
Weeding, Capt. (182)
Winfield-Smith, Lt. S. C. (187)
Worthington-Wilmer, Lt. F. M. (254)

1913.

Archer, Lt. R. H. (454)
Bayly, Lt. C. G. G. (441)
Bruce, Sergt. W. R. (467)
Chidson, Lt. M. R. (471)
Crogan, Lt. F. J. L. (460)
Harrison, Lt.
Hawker, Lt. L. G. (435)
Hosking, Lt. C. G. (472)
Hunter, Sergt.
Kemper, Sergt. K. (444)
Lee, Lt. C. F. (431)
Maclean, Lt. L. L. (427)
Marshall, Lt. R. (470)
McMullen, Lt. J. D. (436)
Merrick, Major G. C. (484)
Mitchell, Lt. W. G. S. (483)
Read, Lt. W. R. (463)
Rees, Lt. Col. W. B. (392)
Stafford, Sergt. W. G. (458)
Street, Sergt. E. J. (439)
Thomas, Sergt. Major
Vagg, Sergt. H. R. (443)

1914.

Barratt, Lieut. A. S.
Barton, Lieut. R. J. F.
Bateman, Lieut. B. M. B.
Bateman, Sergt. F. G.
Binney, Lieut. F. B.
Boger, Lieut. R. J. F.
Bridson, Lieut. C. E. R.
Bonham-Carter, Lieut. I. M.
Brondhurst, Lieut. G. H.
Buckland, Capt. G. C. B.
Burn, Lieut. W. W. A.
Cameron, Lieut. N. C. G.
Carpenter, Lieut. G. G.
Charlton, Capt. L. E. O.
Collins, Lieut. J. C.
Courtney, Lieut. H. S. N.
Couran, Capt. O. (Ae. C. F.)
Cox, Capt. G. H.
Crosbie, Lieut. D. S. K.
Darley, C. C.
Dowding, Capt. H. C. T.
Downer, Capt. C. P.
Dunn, Lieut. K. F. W.
Ellis, Capt. A. J.
Evans, Capt. L. P.
Fell, Capt. E. A. H.
Farrer, Sergt. F.
Ferguson, Capt. F. A.
Fisher, Capt. B. D.
Edridge-Green, Lieut. H. A.
Gallaher, Lieut. A.
Gardner, Sergt. J. R.
Grosvenor, Lord, A. E., Lieut
George, Lieut. A. K. D.
Harrison, Lieut. W. R. E.
Henderson, Capt. G.
Hobby, Sergt. C. A.
Hunt, Lieut. R. E. E.
Jackson, Capt. H. C.
Jackson, 2nd Lieut. J. L.
Jenkins, Lieut. N. M.
Jennings, Capt. H. C.
Kinsman, Major G.
Leighton, Lieut. J. B. T.
Levick, Major A.
Lewis, Lieut. E. R.
Liddell, 2nd Lieut. J. A.
Lindop, Lieut. S. E.
Macdonell, Capt. D. H.
Mansergh, Lieut. W. G.
Marsh, Lieut. A. C. E.
McCrae, Sergt. J.
McDonald, Lieut. C. J.
Mead, Lieut. J. F.
Mills, Lieut. G. D.
Monckton, Lieut. M. H.
Moore, Capt. A. G.
Mudie, Capt. T. C.
Murphy, Capt. C. F.
Pelham, Lieut. Hon. H. L.
Phillips, Major E. W.
Playfair, Lieut. L.
Pritchard, Lieut. F. H.
Robins, Corp. A. C.
Robinson, Lieut. C. E.
Roche, Lieut. H. J. A.
Ross-Hume, A.
Sherlock, Lieut. G. L. E.
Smith, Lieut. S. W.
Spence, Lieut. C. B.
Strong, Lieut. H. B.
Tennent, Lieut. J. E.
Van der Spuy, Lieut. K. R.
Wellesley, Lieut. Lord G.
Wood, Lieut. O. W. G.
Wood-Smith, Lieut. N.

GENERAL ADDENDA AND ERRATA TO AIRCRAFT PAGES.—*continued.*

ITALIAN MILITARY AVIATION.

Aerial Societies:—

Ae. C. d'Italia (Ae.C.I.), 52 via Colonna, Rome.
Ae. Club di Roma (Ae.C.I.), 183, via del Triton, Rome.
Circolo, Aeronautico Napoletano, 295 v. Roma, Naples.
Lega Aerea Nazionale (L.A.N.), 6 via della Signora, Milan.
Societa Aeronautica Italiana (S.A.I.), 4 via Boccaccio, Milan.
" " " " 6, via Cernaia, Turin.
Societa Aviazone, di Torino (S.A.T.), 28 via Roma, Turin.
Societa Ital. di Aviazone, (S.I.A.), 14 v. Monte Napoleone, Milan.

Aerial Journals:—

(3 times a week.)

Gazzetta dello Sport, 19 Corso di Porta, Nuova. L—·05 (= ½d.)

(Weekly):

Italia Sportiva, Rome. L—·05 per no. (= ½d.)
Lettura Sportiva, 17 corso Porta Romano, Milan. L—·10 (= 1d.)
Sports (Gli), 40 and dei Prefretti, Rome. L—·05 (= ½d.)
Stampa Sportiva, 3 v. Davide Bertolotti, Turin. L—·10 (= 1d.)
Tribuna Sport, 22 via S. Giacomo, Naples. L—·10 (= 1d.)

(Monthly):

Rivista della L.A.N. (Lega Aerea Nazionale), Milan.
Rivista del T.C.I. (Touring Club Italiano), 14 v. Monte Napoleone, Milan. L—·40 (= 4d.)
La Navigazione Aerea (Bolletino dell' Ae. C. d'Italia). L—·180 (= 1/6.)

(Annual):

Annuario dell' Aeronautica (Touring Club Italiano), 14 v. Monte Napoleone,Milan.
L—6·00 (= 5/-)

Flying Grounds (Military see next page):—

Cameri.—About 10 kms. from Novaza. Circular in form, about 2½ kms. in diameter. This was the first introduced in Italy and has 15 hangars, all in brickwork. There are workshops with all facilities for construction.

Mirafiori.—Close to Turin. Founded in 1911. Has a total area of 900,000 sq. metres, and which is being extended to 1,500,000 sq. metres. There are in all 24 hangars, 14 belonging to the Flying battalion, 2 to the Italian Aerial Association (S. I. T.), 2 to the Chirribiri school, 1 each of the F. I. A. T., Gobbi and S. P. A. Companies, and 1 of the Aerial Club of Italy.

Taliedo.—A short distance from Milan. Founded in 1900. Has a total area of about 1,000,000 sq. metres. 26 hangars.

Vizzola Ticino.—About 10 kms. from Gallarata and 6 kms. from the military flying school of Somma Lombardo. Founded in 1909, by Ing. Caproni, now contains 7 hangars. In July, 1913, the Battaglione Aviatori took over the school and workshops of Ing. Caproni, who continues to act as technical director. The workshops are now employed in making spare parts for the machines in use of the battalion, and the construction of propellers. The number of workmen employed is about 70.

Aerodrome "Savoia."—Sezione Lombarda, Cascina Costa (Malpensa). Inaugurated 1st July, 1914. Barracks and workshop with 5 hangars. Savoia-Farman school.

Dirigible Headquarters (with hangars, etc., etc.):—

Bracciano.
Milan.
Rome.
Venice.
Verona.

GENERAL ADDENDA AND ERRATA TO AIRCRAFT PAGES.—*continued.*

ITALIAN MILITARY AVIATION.

ORGANISATION, etc.

The *Battaglione Aviatori* has its headquarters at Turin. In July, 1912, it was re-organised along the following lines:—

1 command at Turin.
1 flying work.
1 technical work.
2 troop duty.
6 at the aviation schools, with a certain number of mobile squadrillos.

The recognised grades are:—

a.s.p. aspirante allievo (learners).
a.p. allievo pilota (certificated pilots).
p. pilota militare (superior military brevet).

In flying work the superior pilots are mostly using *Blériots*; the ordinary pilots *Blériot-Caproni, Bristol, Antonio, Deperdussins* and *Voisins*.

The technical section chiefly supervises the theoretical instruction of the *a.s.p.*

The 2 companies on troop duty practical work, preparation for the schools.

FLYING SCHOOLS.

The military schools are:—

Aviano.—Central school. Size about 5 × 2 kilometres. Sheltered from all winds except westerly, by banks of trees. Workshops capable of any type of repairs. Numerous hangars, both of iron and of wood, as also one of the hexagon type.

Miraflori (Turin).—Mixed military and civil school. Hangers. School machines confined to *Blériot* and *Farman* types. Repairing shop. Testing shop for motors, chemical laboratory. Arranged for testing all necessary apparatus, motors, lubricants, etc. Acceptance tests of aeroplanes are made here and examinations for pilots certificates. The whole ground is completely enclosed and admission is only obtained by special permission.

Pordenone.—School for superior brevets. Five kilometres from Aviano. Treeless plain about 1½ × 1 kilometre, but open in all directions to the wind. Small repairing shop, many spacious hangars, with barracks for both officers and men.

S. Francesco al Campo.—Has two hangars, each suitable for 7 *Farman* machines, small repairing shop and carpenters' shop. In July, 1913, it ceased to be a flying school and is now headquarters of the Farman squadron.

Somma Lombarda.—School for *Nieuport* and *Capros* machines. Large flying grounds, fairly flat with low vegetation only. Buildings adjoining the ground for accommodating the staff and students and with shops capable of every type of repairs and also of constructing machines. Capacious hangars.

Marine Flying School (Venice).—Constituted by Royal Decree, 25th August, 1913.

GENERAL TRAINING.

Aspirants commence with instruction in the theory of heavier than air machines, resistance of material and particular instruction in the various type of aero motors in use. They are taken for flights as passengers.

All then go to the training camp about 80% for monoplane work, the remainder for biplanes.

MONOPLANES. Special attention paid to teaching *Gauchis Descent*.

BIPLANES. Much shorter course. Principal feature: *Vol Plané*.

For the *military brevet* the examination is most comprehensive, special attention is paid to flying in wind, manœuvring, climbing, good landings without inconvenience to passengers, cross country flights, etc. The course is generally modelled on war experiences.

TOTAL FLYING STRENGTH.

No particular distinction between naval and military aviators.

Total at end of June, 1914, to be about 231 certificated aviators of whom a fair percentage hold the superior brevet. In addition all the best civilian aviators are held at disposal.

BELGIAN.

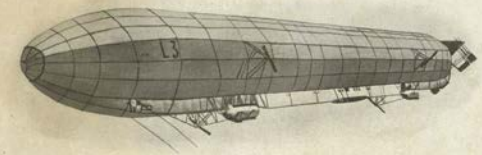
p. 21 *et seq.* Delete the statement "revised by M. Bracke, as these pages had to go to press without M. Bracke's usual revision. Add to Flying Grounds: "Tempsiux (Military)."

BRITISH.

p. 39. This page had to go to press without revision. Delete *Deperdussin* (British).

GERMAN.

Delete all reference to *L S 1 (Schutte Lanz)* as this ship was broken up some little time ago.



L 3. Naval dirigible (Zeppelin).

ITALIAN.

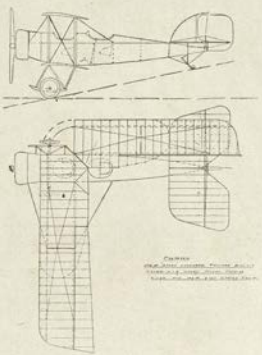
p. 159. CITTA DI MILANO should read "CITTA DI FERRARA type (Forlanini)."

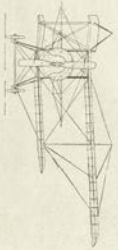
BRITISH AEROPLANES.

S

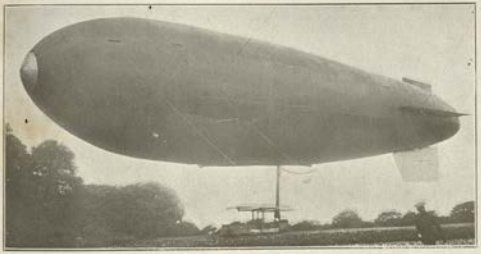
SHORT BROS. Works and flying grounds: Eastchurch, Isle of Sheppey, Kent. London office: Queen's Circus, Battersea Park. Took up construction at a very early date. *Wright* agents in 1909. Have built numerous biplanes and monoplanes to specifications. Produced their own first machine (see 1911 edition) in 1910.

Model and date.	Tandem 2-seater overland tractor biplane.	
Length ... ... feet (m.)	25	7·6
Span ... ... feet (m.)	40	12·19
Area ... ... sq. feet (m²,)	400	·37
Weight ... total ...lbs. (kgs.)	975	·442†
Weight ... useful ...lbs. (kgs.)	725	·329
Motor ... ... h.p.	100 9-cyl. Gnome	
Speed ... max. m.p.h. (km.)	85	·53
Speed ... min. m.p.h. (km.)	39	·25
Endurance ... ... hrs.	5	

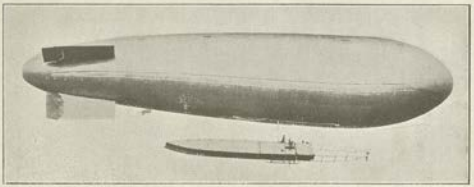




BRITISH MILITARY DIRIGIBLES.

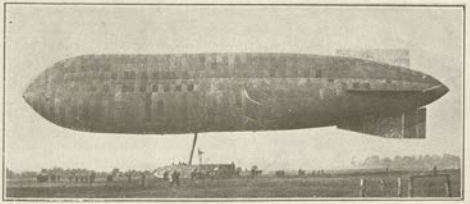


BETA. Crédé.



GAMMA (DELTA & ETA of same general type). Crédé.

PARSEVAL. Crédé.



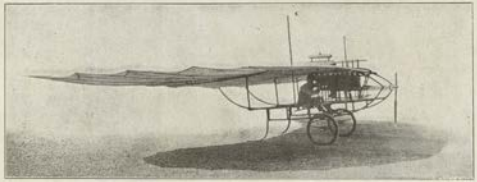
ASTRA TORRES.

HISTORICAL AIRCRAFT.

In the following pages an attempt has been made to include photographs of all aeroplanes of the past six years, which, for one reason or another, "made history" in their own day.

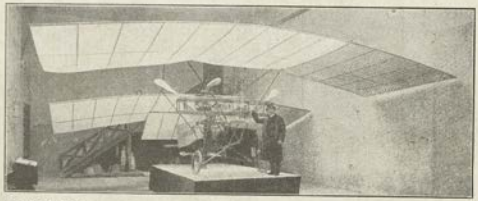
While many are merely freak machines, which in the light of present knowledge seem ridiculous, the germ of modern practice is to be found in many other aircraft illustrated in this cemetery of dead ideals; and it is worth noting that at least one constructor, who is one of the first in the field to-day, commenced operations with machines which were entirely "freaks."

AUSTRIAN.

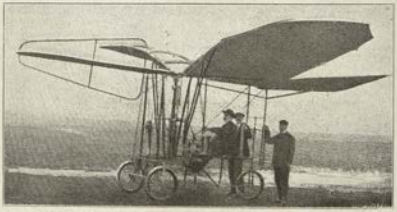


WELS & ETRICH (1908). Original form of the *Etrich* ("*Taube*.")

NEMETHY (1908).

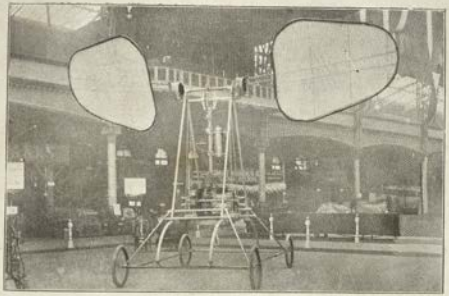


HIPSSICH (1908). Tandem mono. with one propeller before and another in rear of rear plane.



SOLTAU (1910). An ornithopter based on the earlier ideas of *Adehmar de la Hault* (see BELGIUM).

BELGIAN.



DE LA HAULT (1907). One of the earliest attempts at an ornithopter. No flights.

DE LA HAULT II. (1910-11). The ornithopter principle applied to a monoplane. No success met with.

D'HESPEL (1909-10). Single plane and suspended body. Early example of enclosed body. No flights.

BRAZIL.

SANTOS-DUMONT XIX. This little machine, surface only 9 m². made an extraordinary sensation in France in 1909. It flew at the then incredible speed of 65 m.p.h. (100 k.p.h.) Santos-Dumont presented all rights to the world soon afterwards, and a large number were built before it was realised that only an extremely light weight pilot could fly in one. Few of the copies ever left the ground.

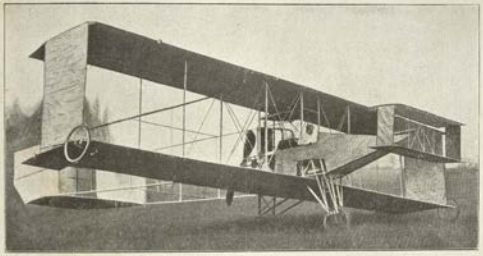
BRITISH.

AVRO (1909). This 24 h.p. biplane, designed by A. V. Roe, was the first British machine to leave the ground.

AVRO (1907). Tractor triplane of only 9 h.p. This flew in Lea Marshes—the lowest horse power yet flown in Europe to the present day.

CODY (1909). Development of a much earlier machine. This one was a general laughing stock for a long time; but it was the direct predecessor of the machine (not very materially different) which was an easy first in the British Army aeroplane trials, 1912.

DE HAVILLAND (1909). The performances of this machine secured a Government appointment for its aviator-designer.

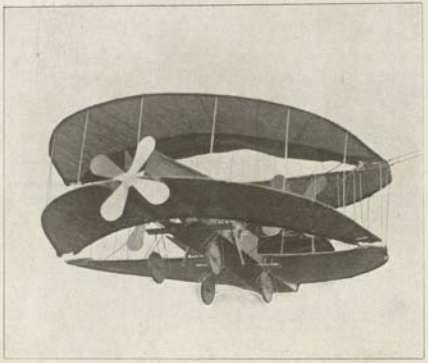


HOWARD WRIGHT (1908-09). The first machine in the world in which special attention was paid to securing a stream line body and minimised wind resistance.

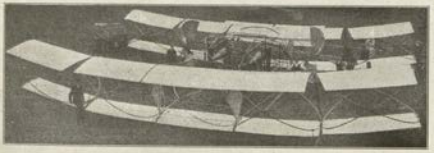
HUMPHREY (1908-09). Earliest British attempt at a water-plane; possibly the earliest design ever produced anywhere.

HUNTINGTON (DUNNE II) (1910). One of the earliest aeroplanes in existence—designed by Captain Dunne about 1905-06, previous to the secret experiments of the British War Office in Scotland, on the Duke of Atholl's estate. Assigned to Prof. Huntington in 1910. Made a few short flights.

PEMBERTON-BILLING (1906-08.) Three were built, the last of which was fitted with the first N.E.C. engine ever built. Lifted before wrecking itself. **Span,** 24 feet. **Chord,** 5 feet; tail-less. **Weight** (unladen) 98 lbs.



"SAFETY" (1909-10).



SEDDON. (1910). Designed by Lieut. Seddon, R.N.

SHORT (1910). The first machine to Short's own design. (The tail here shown is a specially large one fitted by Moore-Brabazon).

VALKYRIE (1910). This was one of the first "tail first" machines to be designed. The experimental machine (also known as the *A.S.L.*), was completed in Feb., 1910.

DANISH.

ELLEHAMMER (1905). On 12th September, 1906, this machine made the first free flight in Europe. On 28th June, 1908, it won the prize at Kiel for the first flight in Germany (distance, 47 m.) It was a tractor biplane with a revolving Ellehammer motor. It also had a pendulum seat as a stabilising device.

FRENCH.

ANTOINETTE IV (1909). In this machine Latham made the first attempt to fly the Channel, 19th July, 1909.

BLERIOT IV (1907-8).

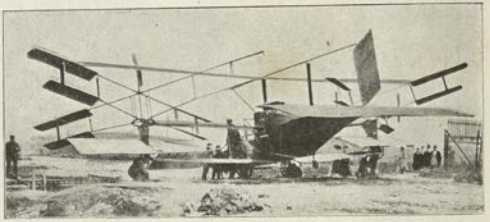
In **1909** the famous *Bleriot XI* was built. This did very well at Reims, 1909. On 25th July, 1909, Bleriot made the first Cross-Channel flight in the machine illustrated below.

BLERIOT XI.

This machine had **length**, 23 feet (7 m.) **Span,** 25¾ feet (7·80 m.) Area, 167 sq. feet (15½ m².) Aspect ratio 4½ to 1. **Motor,** 22-25, 3 cylinder Anzani, **Speed,** *about* 45 m.p.h. (73 k.m.) *Special features:* Fixed wings with rounded edges. Twin elevator and fixed surface tail.

BOUSSON-BORGNIS (1907-08).

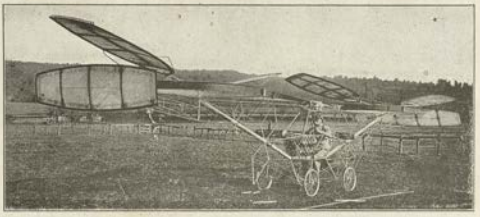
BREGUET (1906). The first Breguet, known as *Breguet Gyroplane I*. Made a flight in October, 1906, being the first helicopter to leave the ground.



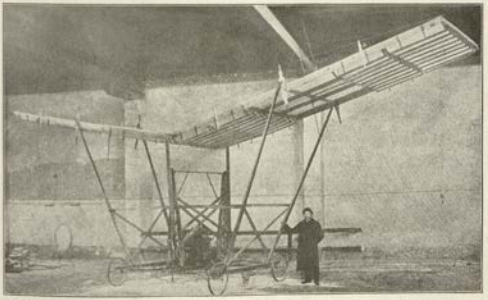
BREGUET-RICHET II bis. (1909). A large and unsuccessful development of the gyroplane.

BREGUET IV (1910). On its appearance, this machine was generally laughed at and nicknamed the "Coffee Pot," till in Aug., 1910, it made a world's record by carrying six, and later proved itself superior in stability to anything then existing.

CHAUVIÈRE (1909-10). Attempt to develop a monoplane with propellers in rear. The idea has been resuscitated for some 1913 military monoplanes.



CORNU (1908). An early helicopter for which flights were claimed, but have also been denied.



COLLOMB (1907-09). Ornithopter, from which great things were once expected.

D'EQUIVELLY (1907-08). Interesting example of the strange machines devised by pioneers.

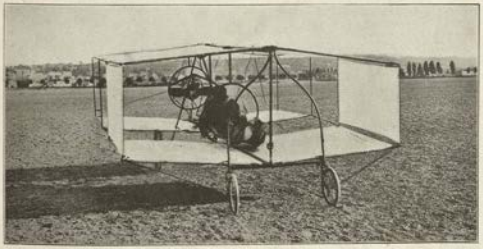
H. FARMAN (1907). This famous machine is the first *Voisin*, and the one on which H. Farman taught himself to fly. It was the first machine to make a turn in the air. Won the Deutsch-Archdeacon Grand Prix, 13th January, 1908, with a flight of 1 minute, 28 seconds. The extra third plane was added later. An Austrian Syndicate subsequently bought the machine.

H. FARMAN (1908). Farman's first idea of a monoplane. It proved too heavy to fly with the power provided. Was eventually sold to a German officer. Three sets of wings and entirely enclosed body.

GABARDINI (1909-10). Very early hydro-aeroplane, antedating the *Fabre*.

GIVAUDIN (1908-09). Built by the Vermorel Co. The first conception of an idea which has since attracted a certain class of inventor in Germany, Italy and the U.S.A.

MILITARY (1909). The first special military aeroplane ever built. It was specially designed by Capt. Dorand, for what were then held to be the aerial necessities of the French Army. The planes were placed well above the body, giving the pilot a very clear uninterrupted view.

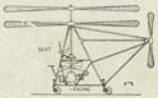


PISCHOFF-KOECHLIN (1906 or earlier). Dates from the days when a box-kite was the elementary idea in design, and the accepted position of the aviator lying prone.

PISCHOFF-KOECHLIN (1908). Very early example of a tractor biplane. The extra span of the upper plane is also of interest. The machine had twin mono-elevators aft and also twin rudders.

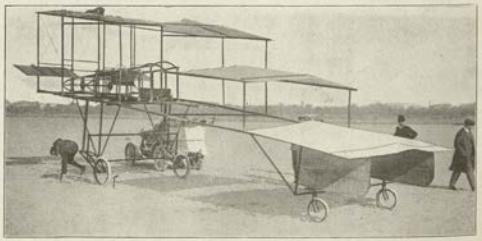
R.E.P. (1908). Early example of enclosed stream line body. Apparently the first machine in which steel construction appeared.

VOISIN (1908). The first European aeroplanes to fly with any real success.



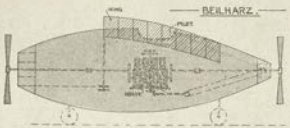
VUITTON-HUBER (1908). Early helicopter

VUIA (1908). Earliest known machine with folding wings.

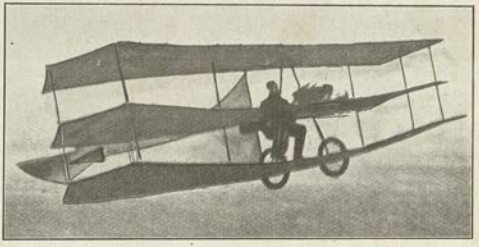


WITZIG-LIORE-DUTILLUEL (1908-09). First or one of the first appearances of the idea of a series of staggered planes, with which Sellers has ever since experimented in the U.S.A.

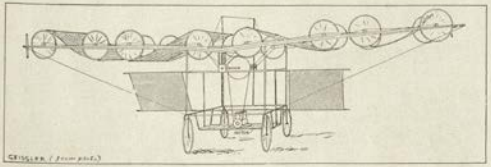
GERMAN.



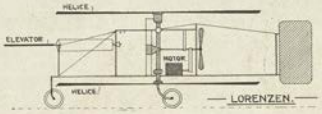
BEILHARZ (1909). First design in which a completely closed in body figured.



GRADE (1908). The first German built machine to fly.

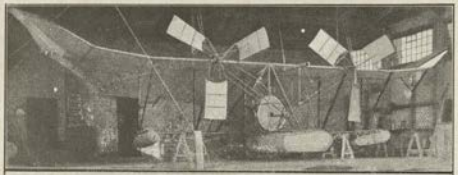


GEISLER (1908).

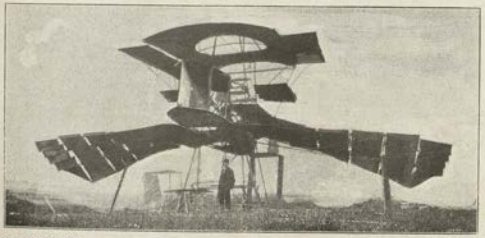


LORENZEN (1908-'09).

GERMAN.



PARSEVAL (1909). Early hydro-aeroplane. Specially designed for military purposes by Major Parseval.

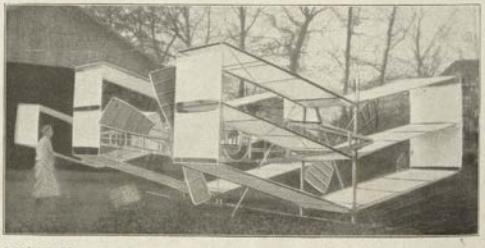


SCHOLTZ (1908). Never left the ground

ITALIAN.

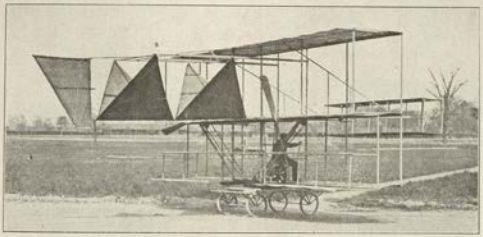
MILLER (1908-09). First aeroplane to be designed and constructed by Italians.

SWISS.

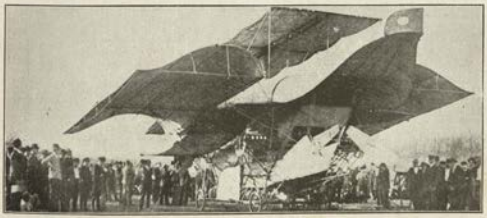


DUFAUX (1908-09). First Swiss machine.

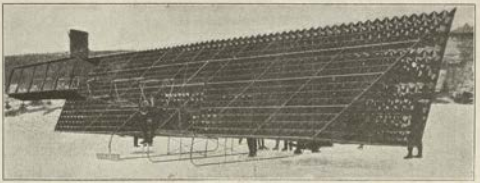
U.S.A.



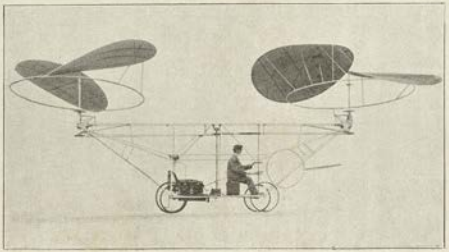
BOKOR (1909). The third American machine to leave the ground; the second purely U.S. one.



CALL II (1909).



CYGNET II (1908). Designed by Dr. Graham Bell, of the Aeronautical Society of America. Bell (Canadian), Glen Curtis (U.S.), Herring (U.S.), and Burgess (Canadian). It made short flights.



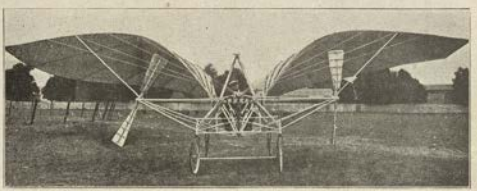
ENGLISH (1909). In 1909 extraordinary claims were made for this machine and great things expected. On a full power trial in its shed it broke loose, and smashed itself against the roof. No recorded outdoor results.

HERRING-BURGESS (1910).

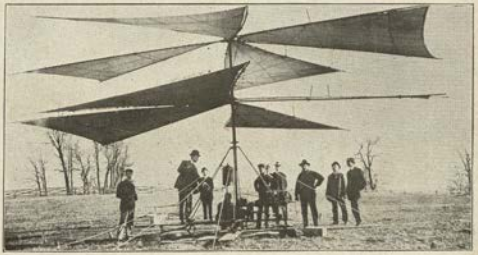
JUNE BUG (1908-09). Famous machine of its era. Built by the Aeronautical Society of America (see *Upper IV*). Second machine to fly in the U.S.A. Did 2000 miles before being broken up.

HULBERT (1910). This strange machine built in Switzerland by Dr. Dane Hulbert, achieved several flights. The planes were placed longitudinally instead of in the usual way.

KIMBALL (1909). First machine in which a large number of propellers was attempted. Failed.

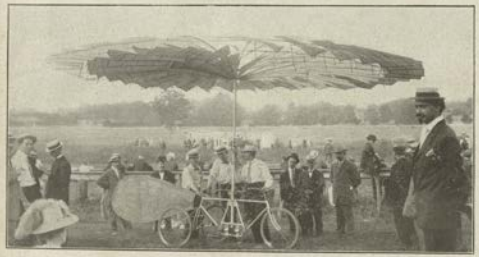


LOOSE (1910).

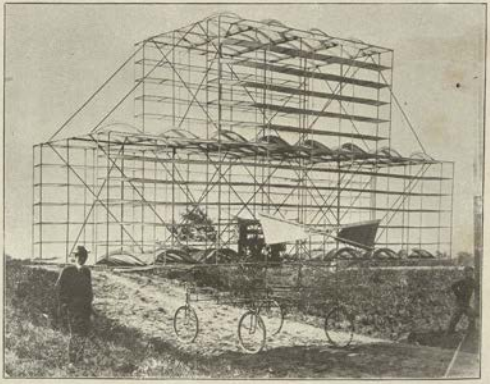


LUYTIES OTTO (1908).

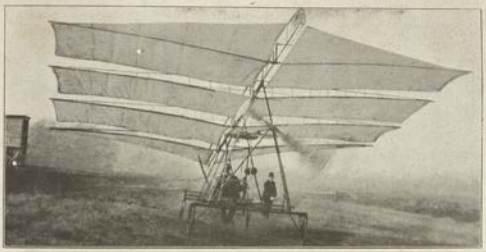
MOISSANT (1910). Built entirely of aluminium. Designed by the late John Moissant. Failed.



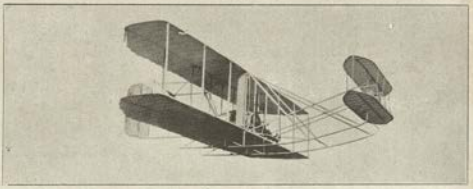
RICKMAN (1908).

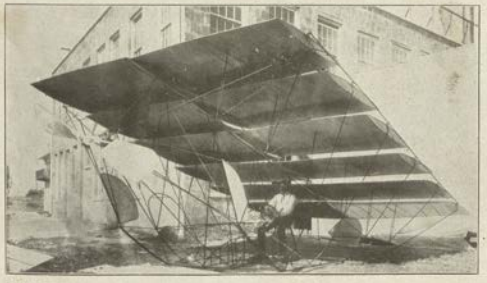


ROSHON (1908).

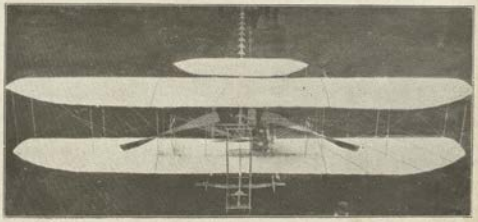


WILLIAMS (1908).





ZERBE (1909).



WRIGHT (1908). Two views of the machine with which Wilbur Wright startled all Europe from August, 1908 to April, 1909. First U.S. machine to fly.

PART C.

AERO ENGINES,

ALPHABETICALLY ARRANGED IN ORDER OF COUNTRY OF ORIGIN.

AUSTRIAN, BRITISH, FRENCH, GERMAN, ITALIAN, U.S.A.

Note.—So far as possible this is a complete list of all the aero engines of any importance.

Data are confined to what is now being made or actually in use; untested "show novelties" are ignored.

In the case of some engines it has for various reasons proved impossible to obtain full data in time for inclusion in this edition.

In a general way these lists are confined to aeroplane engines.

AUSTRIAN.

Revised by Herr Ing. W. Isendahl.

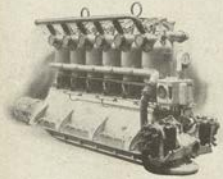
AUSTRO-DAIMLER.

35-40 h.p., 4 cyl., 100×120 (1450 r.p.m.)...165 lbs.
65-70 h.p., 4 cyl., 120×140 (1350 r.p.m.)...232 lbs.
120 h.p., 6 cyl., 130×175 (1200 r.p.m.)...419 lbs.

Vertical water-cooled.

H.T. Magneto.
All Valves overhead. Rocking levers and piston rods.
Forced lubrication.

Pressed steel pistons.
Nickel-chrome crank shaft, hollow and closed.
White-metal bearings.
Cast-iron single cylinders (copper jackets).
Single camshaft.



120 h.p.

The 120 has 2 carburetters and 2 H.T. magnetos.

BRITISH.

A. B. C.

All British Engine Co., Ltd., Brooklands, Weybridge.

100 h.p., 8 cyl., 127×102, type A..... 395 lbs.
250 h.p., 12 cyl., 125×185, „ B .....750 lbs.
150 h.p., 42 cyl., 90× 50, „ C.....485 lbs.

V type, A and B water-cooled (pump), C air-cooled by enclosed jackets and fan.

H.T. magneto (2 to each engine).
Mechanical inlets.
Forced lubrication.

Features.—
Steel cylinders, cut from the solid and in the case of water-cooled engines, steel jackets welded.
Overhead camshaft (hemispherical heads).
Valves (90 degrees).
Steel crank case cut from the solid.
Nickel chrome steel crank shaft (roller bearings throughout, including big ends).

A. B. C. Road Motors, Ltd. (Affiliated Company).

3½ h.p. 500 c.c. motor cycle engine.

Horizontally opposed.
Overhead valves.
Steel cylinders.
Roller bearings.
Developing up to 10 h.p. for working wireless on aeroplanes and dirigibles, and also air blowers for dirigibles.

ALVASTON.

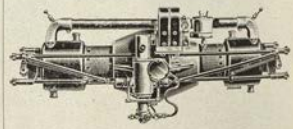
Alvaston Motors, Derby.

20 h.p., 2 cyl., 114×114 (1250 r.p.m.) ..... 95 lbs.
30 h.p., 2 cyl., 132×127 (1200 r.p.m.) .....120 lbs.
50 h.p., 4 cyl., 114×127 (1200 r.p.m.) .....155 lbs.

Horizontal opposed.

H.T. magneto (Bosch).
Mechanical inlets.
Forced lubrication.

Features.—
Water-cooled cylinders.
Plain bearings to crank shaft.
Ball bearings to cam spindles.
Internal ball thrust collar on crank shaft.
Copper jacketted cylinders.



ARGYLL.

Argylls, Ltd., Alexandria, Glasgow.

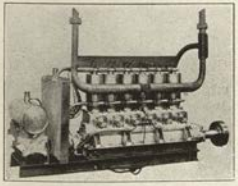
120 h.p., 6 cyl., 125×175.....550 lbs.

Vertical type, water-cooled (pump).

H.T. magneto (2 spark).
Valves (single sleeve) Argyll patent.
Pump lubrication (two).

Features.—

Steel cylinders.
Aluminium crank case.
Steel pistons fitted with 2 rings.
Steel crank shaft; bearings white metal linings.
Zenith carburetter (two).



GREEN.

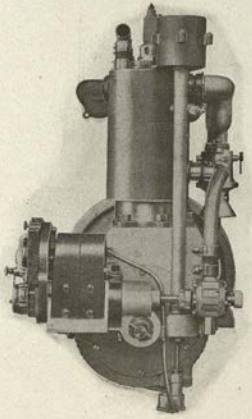
Green Engine Co., Ltd., 166, Piccadilly, London, W.

30-35 h.p., 4 cyl., 105×120 .....158 lbs.
50-60 h.p., 4 cyl., 140×146 .....283 lbs.
90-100 h.p., 6 cyl., 140×152 .....450 lbs.

Vertical, water-cooled (pump). H.T. magneto.
Mechanical inlets. Forced lubrication.

Features.—

Steel cylinders. Overhead cam shaft.
Copper jackets. Nickel chrome crank shaft.
Overhead valves. White metal bearings.



STATAX.

Statax Manufacturing Company, 1, Quality Court, Chancery Lane, London, W.C.

40-44 h.p., 5 cyl., 100×120 (1250 r.p.m.)...172 lbs.
100 h.p., 10 cyl., 90×160 (1250 r.p.m.)...218 lbs.

Rotary parallel cylinders, air-cooled.

H.T. magneto (Bosch).
Single piston valves.
Forced lubrication by Bosch pump.

Features.—

No crank shaft.
No wobble gear.
Double ignition by two separate magnetos.
Single ignition point.
Gas admitted direct to engine through central shaft.
Oil by separate lubricating pipes.
Ball bearings throughout.
Great economy of fuel and oil consumption.
Reduced head resistance owing to small diameter of engine.

SUNBEAM.

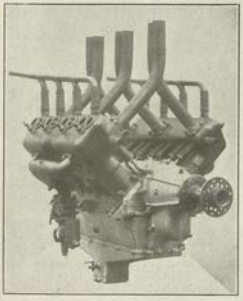
Sunbeam Motor Car Co., Ltd., Moorfield Works, Wolverhampton.

150 h.p., 8 cyl., 90×150 (2000 r.p.m.) ..... 480 lbs.
225 h.p., 12 cyl., 90×150 (2000 r.p.m.) ..... 480 lbs.

V type, water-cooled.

H.T. 8 type magneto (Bosch) 150 h.p.
H.T. 6 type (Bosch) 225 h.p.
Forced lubrication.

Special Features.—
All valves one side.
Single camshaft.
Cylinders "en bloc."



WOLSELEY.

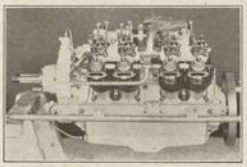
Wolseley Tool & Motor Car Co., Ltd., Adderley Park, Birmingham.

60-80 h.p., 8 cyl., 102×140, type A ..... 400 lbs.
" " 102×140, " B ..... 429 lbs.
" " 95×140, " C ..... 385 lbs.
" " 95×140, " D ..... 405 lbs.
120 h.p., 8 cyl., 125×175 (1150 r.p.m.) ... 710 lbs.

V type. Types A and B of the 60-80 air-cooled (water-cooled exhausts). The others water-cooled.
Types A and C of the 60-80 are for direct coupling of propeller, with double thrust ball bearings.
Types B and D geared to half crank shaft speed.

Bosch dual ignition.
Mechanical inlets.
Forced lubrication.

Features.—
Steel cylinders (single).
Overhead valves (removable seats).
Nickel chrome crank shaft, on 3 bearings.



Foreign Engines,

agented or built in England.

ANZANI (British Anzani Engine Co., Ltd., 50, Regent St., Piccadilly Circus, London, S.W.

AUSTRO-DAIMLER (Beardmore Austro-Daimler Aero Engine Ltd., 112, Gt. Portland St., London, W.) Also at Dalmuir, Scotland.

CANTON-UNNÉ (Dudbridge Ironworks, Ltd., Stroud, England).

CURTIS (The Austin Motor Co., Ltd., Longbridge Works, Northfield, Birmingham).

GNÔME (Gnome Engine Co., 47, Victoria St., London, S.W.

FRENCH.

Revised by Alexander Dumas.

ANZANI.

112 Boulevard de Courbevoi, Courbevoi (Seine).

30 h.p., 3 cyl., 105 × 130 (1575 r.p.m.) ... 154 lbs.
30 h.p., 3 cyl., 105 × 120 (1300 r.p.m.) ... 122 lbs.
40-45 h.p., 6 cyl., 90 × 120 (1300 r.p.m.) ... 154 lbs.
50-60 h.p., 6 cyl., 105 × 120 (1300 r.p.m.) ... 176 lbs.
60-65 h.p., 10 cyl., 90 × 120 (1250 r.p.m.) ... 216 lbs.
80 h.p., 10 cyl., 90 × 130 (1250 r.p.m.) ... 253 lbs.
100 h.p., 10 cyl., 105 × 140 (1100 r.p.m.) ... 298 lbs.
125 h.p., 10 cyl., 115 × 155 (1250 r.p.m.) ... 464 lbs.
200 h.p., 20 cyl., 105 × 140 (1250 r.p.m.) ... 683 lbs.

Radial type, air-cooled.

H.T. magneto.
Mechanical inlets.
Forced lubrication.

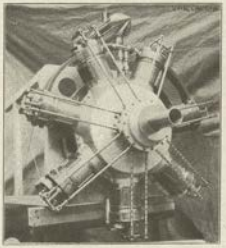
Features.—
Extremely simple construction.
Mainshaft single crank.
Flywheel specially balanced to compensate.
Zenith carburetter.

CANTON-UNNÈ (SALMSON).

9 Avenue les Moulineaux, Billancourt (Seine).

90 h.p., 7 cyl., 120 × 140 (1250 r.p.m.) ... 375 lbs.
105 h.p., 9 cyl., 120 × 140 (1250 r.p.m.) ... 454 lbs.
150 h.p., 9 cyl., 120 × 150 (1250 r.p.m.) ... 608 lbs.
200 h.p., 14 cyl., 120 × 140 (1250 r.p.m.) ... 661 lbs.

H.T. magneto.
Mechanical inlets.
Forced lubrication.
Steel cylinders, copper jackets.
Overhead Valves.
Single special steel crank shaft on ball bearings
Aluminium alloy or steel crank case.



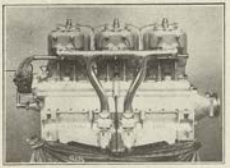
CHENU.

221 *bis* Boulevard de Strasbourg, Billancourt (Seine).

65 h.p., 4 cyl., 110 × 130 (1800 r.p.m.) ... 253 lbs.
90 h.p., 4 cyl., 110 × 130 (2300 r.p.m.) ... 375 lbs.
100 h.p., 6 cyl., 110 × 130 (1800 r.p.m.) ... 397 lbs.
260 h.p., 6 cyl., 150 × 200 (1600 r.p.m.) ... 950 lbs.

Vertical, water-cooled (thermo syphon).

H.T. magneto.
Pump lubrication.



CLEMENT BAYARD.

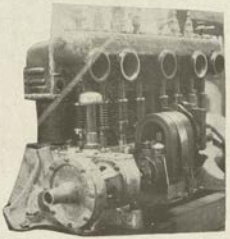
Usines Clement Bayard, 33 quai Michelet, Levallois-Perret, (Seine).

40 h.p., 4 cyl., 100 × 120 (1250 r.p.m.) ... 243 lbs.
75 h.p., 4 cyl., 135 × 160 (1250 r.p.m.) ... — lbs.
100 h.p., 4 cyl., 155 × 185 (1100 r.p.m.) ...
180 h.p., 6 cyl., 155 × 185 (1200 r.p.m.) ...
200 h.p., 4 cyl., 190 × 230 (1200 r.p.m.) ... — lbs.

Dirigible engines. Patent spring suspensions.
Vertical, water-cooled.

H. T. magneto.
Forced lubrication.

Overhead valves worked by two cams only.
Exhausts opened and closed by spring on tappet.



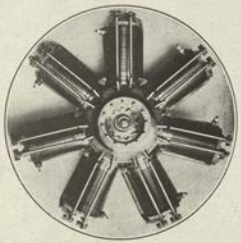
Dirigible engine.

CLERGET.

Clerget Blin & Cie, 37 rue Carré, Levallois (Seine).

50 h.p., 4 cyl., 110×120 (1500 r.p.m.) ...210 lbs.
100 h.p., 4 cyl., 140×160 (1250 r.p.m.) ...335 lbs.
(vertical, water-cooled),
also
200 h.p., 8 cyl., 140×160 (1275 r.p.m.)...760 lbs.

The 200 h.p. has 2 carburetters and 2 magnetos, and is **V** type.



200 h.p. Clerget.

also
60 h.p., 7 cyl., 120×120 (1200 r.p.m.).....198 lbs.
80 h.p., 7 cyl., 120×150 (1200 r.p.m.).....206 lbs.

Rotary, air-cooled.
H.T. magneto.
Mechanical inlets.

DE DION

56 Quai National, Puteaux (Seine).

80 h.p., 8 cyl., 100×120 (1700 r.p.m.) ...463 lbs.
V type, air-cooled.
H.T. magneto.
Forced lubrication by pump.
Mechanical inlets.

GNÔME

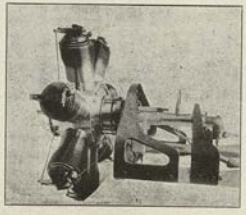
Société des moteurs Gnôme, 3 rue La Boëtie, Paris.

50 h.p., 7 cyl., 110×120 (1200 r.p.m.) ...165 lbs.
70 h.p., 7 cyl., 130×120 (1300 r.p.m.) ...183 lbs.
80 h.p., 7 cyl., 124×140 (1200 r.p.m.) ...191 lbs.
100 h.p., 14 cyl., 110×120 (1200 r.p.m.) ...220 lbs.
140 h.p., 14 cyl., 130×120 (1200 r.p.m.) ...286 lbs.
160 h.p., 14 cyl., 124×140 (1200 r.p.m.) ...308 lbs.
Radial rotary, air-cooled.

H.T. magneto.
Automatic inlets.
Forced lubrication.

There is also a monosoupape type.

Features.—
Single crank pin
Steel cylinders turned from solid.
Single ignition point.
Gas admitted through hollow crank shaft to crank case, thence to pistons; oil enters in a similar way.
Nickel chrome crank shaft, ball bearings.
Steel crank case.
The 100 h.p. has seven cylinders behind seven others. Larger sizes ditto.



50 h.p. Gnome.

NIEUPORT.

46 Boulevard du Poindu Jour, Issy les Molineaux (Seine).

28 h.p., 2 cyl., 135×150 (1200 r.p.m.).....154 lbs.

Horizontal, air-cooled.

H.T. magneto.
Mechanical inlets.
Forced lubrication.

LE RHONE

68 Boulevard Kellerman, Paris.

60 h.p., 7 cyl., 105×140 (1200 r.p.m.) ...194 lbs.
80 h.p., 9 cyl., 105×140 (1200 r.p.m.) ...247 lbs.
100 h.p., 11 cyl., 105×140 (1200 r.p.m.) ...265 lbs.
120 h.p., 14 cyl., 105×140 (1150 r.p.m.) ...375 lbs.
160 h.p., 18 cyl., 105×140 (1150 r.p.m.) ...463 lbs.

Rotary, air-cooled.

RENAULT.

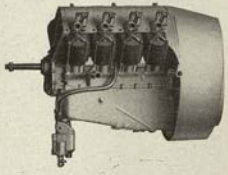
Louis Renault, 15 rue Gustave-Sandoz, Billancourt (Seine).

40 h.p., 8 cyl., 75×120 ..... 211 lbs.
70 h.p., 8 cyl., 96×120 ..... 397 lbs.
100 h.p., 12 cyl., 96×140 ..... 640 lbs.

Cylinders at 90°.
V type, air-cooled (special cooling).

H.T. magneto.
Mechanical inlets.
Pump lubrication.

Features.—
Two to one shaft, made specially strong to admit of the direct coupling of a propeller.
Inlet valves operated from below, exhausts placed above them at the side.



GERMAN.

By our Special German Editor.)

ARGUS.

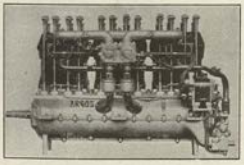
Argus-Motoren G.m.b.H., Flottenstrasse 39 and 40, Reinickendorf bei Berlin. Established 1900.

70 h.p., 4 cyl., 124×130 (1400 r.p.m.) .....254 lbs.
100 h.p., 4 cyl., 140×140 (1250 r.p.m.) .....290 lbs.
150 h.p., 6 cyl., 140×140 (1250 r.p.m.) .....353 lbs.

Vertical, water-cooled (pump).

H.T. magneto (Bosch).
Mechanical inlets.
Splash and lubrication.

Features.—
Cast-iron cylinders.
Cylinders in pairs.
Valves one side (single cam shaft).
Crank shaft on ball bearings, closed and hollow.



150 h.p.

BASSE & SELVE.

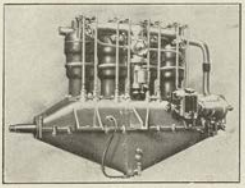
Altena in Westfalen.

50 h.p., 4 cyl.
100 h.p., 4 cyl.
110 h.p., 4 cyl.

Vertical, water-cooled (pump).

H.T. magneto (Bosch).
Mechanical inlets.

Features:—
Cylinders in parts except in the 100 h.p., which has single cylinders.
Side valves to the 50 and 100: overhead in the 110.
Two magnetos except to the 50.



BENZ.

Benz & Cie, Mannheim.

100 h.p., 4 cyl., 130×180 (1250 r.p.m.) ...337 lbs.
100 h.p., 6 cyl., 106×150 (1350 r.p.m.) ...357 lbs.

Vertical, water-cooled (pump).

2 H.T. magneto (Bosch).
Mechanical inlets.
Forced lubrication.

Features.—
Cast-iron cylinder, steel jackets.
Single cylinders.
All valves overhead (single cam shaft).
Crank shaft hollow on 5 metal bearings.

150 h.p.

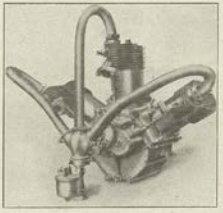
The 100 h.p. won the Kaiser's prize of 50,000 marks.

HILZ.

Hilz Motorenfabrik G.m.b.H., Fürstenwallstr. 189, Düsseldorf.

25-30 h.p., 3 cyl., 105×130 (1400 r.p.m.) ... ?
50 h.p., 5 cyl., 105×130 (1400 r.p.m.) ... ?

Radial, air-cooled.
H.T. magneto (Bosch).
Automatic inlets.
Splash and forced lubrication.
Steel cylinders.
Crank shaft, hollow, on white metal bearings.



MERCEDES-DAIMLER.

Daimler Motoren G.m.b.H., Stuttgart-Untertürkheim.

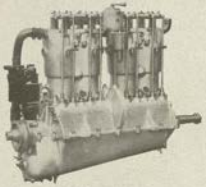
50 h.p., 4 cyl., 122×140 (1400 r.p.m.) ..... 276 lbs.
70 h.p. (as above, but *inverted*) .. .. 298 lbs.
90 h.p., 6 cyl., 105×140 (1350 r.p.m.) ..... 309 lbs.

Vertical, water-cooled (pump).
H.T. magneto. (Eisemann in the 70, two Bosch in the 90).
Mechanical inlets.
Forced lubrication.

Features of the 70's.—
Cast-iron cylinders (in pairs).
Overhead valves.
Single cam shaft.
Crank shaft, hollow, on metal bearings.

Features of the 90.—
Steel cylinders, with steel jackets.
2 carburetters (Mercedes-Daimler), *otherwise as the 70's.*

90 h.p.



70 h.p. Mercedes-Daimler.

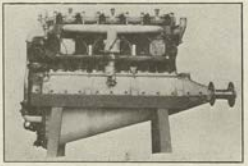
RICHARD & HERING.

110 h.p., 6 cyl., 120×150 (1300 r.p.m.)... 440 lbs.

Vertical, water-cooled.

H.T. magneto (2).

Features,—
Cylinders in pairs.
Overhead valves.

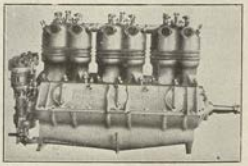


RHEINISCHE AEROWERKE.

Rheinische Aerowerke G.m.b. H., Enskirchen.

50 h.p., 3 cyl., 105×130 ... . 119 lbs.
55 h.p., 5 cyl., 105×130 ..... 194 lbs.
85 h.p., 7 cyl., 105×150 ..... 297 lbs.
110 h.p., 9 cyl., 105×150 ..... 341 lbs.
(all air-cooled).
70 h.p., 4 cyl., 120×140 ..... 286 lbs.
100 h.p., 6 cyl., 120×140 ..... 413 lbs.
(water-cooled).

Two magnetos to all except the two smallest.



SCHWADE.

Otto Schwade & Co., Erfürt.

50 h.p., 7 cyl.
70 „ 7 „
80 „ 7 „
100 „ 9 „
200 „ 18 „
Rotary: air-cooled.

ITALIAN.

CAPRONI & FACCANONI.

Soc. di Aviazione Ingri Caproni & Faccanoni, Vizzola Ticino.

60 h.p. 6 cyl., 105×130 ....176 lbs.
120 h.p., 12 cyl., 105×130 ..... lbs.

Radial, air-cooled.

H.T. magneto.
Mechanical inlets.
Forced lubrication.

FIAT.

(Dirigibles only.)
Fabbrica Italiano Automobile Torino, 30-35 Corso Dante, Turin (Torino).

60 h.p., 4 cyl., 150×200 (1200 r.p.m.) ... 220 lbs.
200 h.p., 4 cyl., 170×250 (1200 r.p.m.) ...1443 lbs.

Vertical.

H.T. magneto and accumulators.
Mechanical inlets.
Forced lubrication.

Features—
Enclosed valves.
Single cast-iron cylinders.

GNOME.

Fab. Italiana Mot. Gnome, 73 Strada Venaria, Turin (Torino).

Works of the Italian built Gnome engines.

ISOTTA-FRASCHINI.

(Dirigibles only.)
Fabbrica Automobili Isotta-Fraschini, 79 Via Monte Rosa, Milan.

100 h.p., 4 cyl., 130×180 (r.p.m.) ... 602 lbs.
500 h.p., 8 cyl., 150×200 (r.p.m.) ...1543 lbs.

Vertical.

H.T. magneto.
Mechanical inlets.
Forced lubrication (pump)

Features.—
Overhead inlets.
Horizontal exhausts.
Special radiation.
Zenith carburetter.

ITALA.

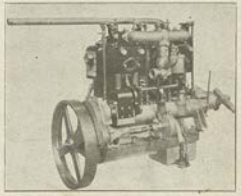
Itala Fabbrica Automobili, Barriera Orbassano, Turin (Torino).

50-55 h.p., 4 cyl., 115×140 (1500 r.p.m.)...397 lbs.

Vertical, water-cooled (pump).

H.T. magneto.
Mechanical inlets.
Forced lubrication.

Features.—
Cylinders in pairs.
Overhead inlets.
Automatic carburetter.



L. U. C. T.
Ladetto-Ubertalli & Cavalchini, Via Cavalli-Angolo Via Circonvallazione Turin (Torino).

50 h.p., 7 cyl., 110×120 ..... lbs.
80 h.p., 9 cyl., 110×120 ..... lbs.
100 h.p., 9 cyl., 122×150 ..... lbs.

Rotary, air-cooled.

H.T. magneto.
Mechanical inlets.
Forced lubrication.

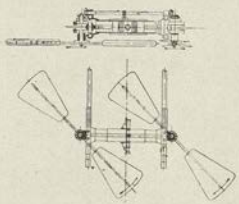
S. P. A.
Società Ligure Piemontese Automobili, Barriera Crocetta, Turin.

40-50 h.p., 4 cyl., 95×150 (1200 r.p.m.) .....199 lbs.

Horizontal, water-cooled (pump).

H.T. magneto and accumulators.
Mechanical inlets.
Forced lubrication.

Features.—
Two pistons per cylinder.
Ball bearings throughout.



Dirigible engine.
There is also a vertical 100 h.p. dirigible engine.

U. S. A.

ADAMS-FARWELL.

21, Athol Street, Dubuque, Iowa.

36 h.p., 5 cyl., 102 × 88 (1200 r.p.m.) ..... 97 lbs.
63 h.p., 5 cyl., 142 × 127 (1200 r.p.m.) ... 250 lbs.
72 h.p., 5 cyl., 152 × 152 ..... 285 lbs.

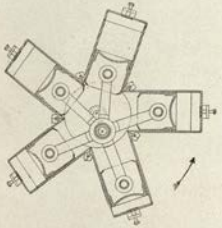
Rotary horizontal.

H.T. magneto.
Special valves.

Features.—

No flywheel.
All valves in cylinder head, actuated by a single push and pull lever worked by a single cam. Valves close outwardly and are held shut by centrifugal force.
Variable lift.
Exhaust ports.
Mechanical oil feed.

Engine weights are "fully complete."



ALBATROSS.

Albatross Co., Detroit, Mich.

50 h.p., 6 cyl., 113 × 125 (1250 r.p.m.) ..... 250 lbs.
100 h.p., 6 cyl., 137 × 125 ..... 275 lbs.

Radial. The 50 is air-cooled, the 100 water-cooled.

BOLAND.

Aero Marine Plane and Motor Co., Avondale, N.J.

60 h.p.
70 „
100/125 h.p.

CALL.

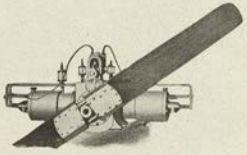
Aerial Navigation Co. of America, Girard, Kansas.

50 h.p., 2 cyl., 150 × 131 ..... 185 lbs.
100 h.p., 4 cyl. ..... 325 lbs.

Horizontal opposed, water-cooled.

Mechanical inlets.
Magneto ignition (Bosch).
Special silencer.
Vanadium iron cylinders.
Forced lubrication.

Features.—



CURTISS.

Curtiss Aeroplane Co., Hammondsport, N.Y.

Vertical.

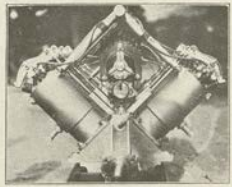
40 h.p., 4 cyl., 100 × 125 (1100 r.p.m.) ..... lbs.
75 h.p., 8 cyl., 100 × 125 (1100 r.p.m.) ..... 250 lbs.
60 h.p., 6 cyl., (1350 r.p.m.) ..... lbs.
90/100 h.p., 8 cyl., (1350 r.p.m.) ..... 320 lbs.

V shape, water-cooled (pump).
160/200 h.p., 8 cyl., 125 × 180 ..... 650 lbs.

H.T. magneto (Bosch dual).
Mechanical inlets.
Splash and forced lubrication.

Features.—

Single cylinders, monel metal jackets.
All valves in cylinder heads, actuated by rocking levers from single cam shaft.



DETROIT AEROPLANE CO.

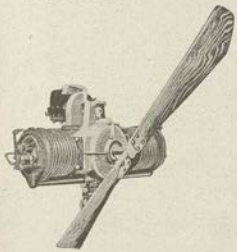
Detroit Aeroplane Co., Detroit, Mich.

30-40 h.p., 3 cyl., 127×127 (1200 r.p.m.) ... 110 lbs.

2 cycle horizontal, air-cooled.

H.T. magneto.
Automatic inlets.
Splash lubrication.

Features.—
All valves in cylinder heads operated by a single cam.
Valves easily detached.
Very large valves.
Schebler carburetter



Over-all length of the 30/40 is 19 in.

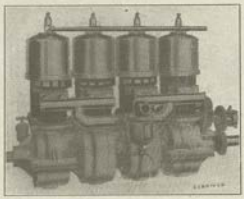
ELBRIDGE.

Elbridge Engine Co., 10, Culver Road, Rochester, N.Y.

40 h.p., 4 cyl., 123×114 ..... 198 lbs.
60 h.p., 6 cyl., 123×114 ..... 257 lbs.

Vertical, water-cooled. Valveless. Oil in gas.

Features.—Extra large bearings.



GYRO.

774, Girard St., Washington, D.C.

50 h.p., 7 cyl., 110×120 ..... 160 lbs.
80 h.p., 7 cyl., 110×120 ..... 207 lbs.

Rotary, air-cooled.

Features.—
Absence of back pressure.
No inlet valves.

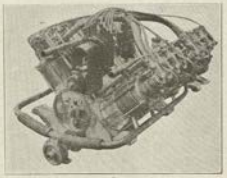
HALL-SCOTT.

Hall-Scott Motor Car Co., San Francisco, Cal.

30 h.p., 4 cyl., 100×100 ..... 142 lbs.
40 h.p., 4 cyl., 100×125 ..... 150 lbs.
60 h.p., 8 cyl., 100×100 ..... 235 lbs.
80 h.p., 8 cyl., 100×125 ..... 270 lbs.
100 h.p. ..... lbs.

First two are vertical, the others V type, water-cooled (pump).
H.T. magneto (Bosch).
Mechanical inlets.
Pump lubrication.

Cast-iron cylinders.
All valves overhead.
Copper jacketted.
Special Stromberg carburetter.
Special radiators.



KEMP (GREY EAGLE).

Kemp Machine Works, Muncie, Ind.

1912 *models*:

35 h.p., D 4 cyl., 100×113 ..... lbs.
50 h.p., E 6 cyl., 100×113 ..... 200 lbs.

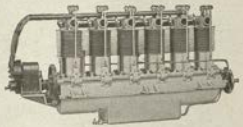
1913 *models*:

16 h.p., G 2 cyl. ..... lbs.
35 h.p., I 4 cyl. ..... lbs.
55 h.p., H 6 cyl. ..... lbs.
75 h.p., J 8 cyl. ..... lbs.

Vertical, air-cooled.

H.T. magneto.
Mechanical inlets.
Pump lubrication.

Features.—
Overhead valves.
Extra large exhausts in centre of cylinders.
Special semi-steel (grey iron) cylinders.
Designed to work at 350°—400° Fahr.



KIRKHAM.

C. Kirkham, Savona, N.Y.

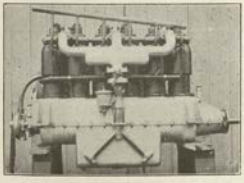
45 h.p., 4 cyl., 105×120 (1400 r.p.m.) ..... 180 lbs.
65 h.p., 6 cyl., 105×120 (1300 r.p.m.) ..... 235 lbs.
75 h.p., 6 cyl., ×120 (1300 r.p.m.) ..... 255 lbs.
110 h.p., 8 cyl., 105×120 (1200 r.p.m.) ..... 310 lbs.

Vertical, water-cooled (pump).

H.T. magneto (Bosch, 2 spark).
Forced lubrication.

Features.—

Cast iron cylinders and pistons.
Patent poppet-sleeve valves.



MAXIMOTOR.

Maximotor Makers, Detroit, Mich.

50 h.p., 4 cyl., 113×127 (r.p.m.)....200 lbs.
60-70 h.p., 4 cyl., 127×127 (r.p.m.).... lbs.
70-80 h.p., 6 cyl., 157×127 (r.p.m.).... lbs.
80-100 h.p., 6 cyl., (r.p.m.).... lbs.
100 h.p., 4 cyl., 150×150 (r.p.m.).... lbs.
150 h.p., 6 cyl., 150×150 (r.p.m.).... lbs.

Vertical, water-cooled (pump).

H.T. magneto (Bosch or Mea).
Mechanical inlets (automatic in the 50 and 70.)
Forced lubrication.

Features.—

Started from aviator's seat.
Double plugs.
Half compression fitted.
Crank shaft, hollow, on 3 ball bearings.

ROBERTS.

Roberts Motor Co., Sandusky, Ohio.

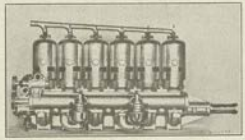
50 h.p., 4 cyl., 113×125 .....165 lbs.
75 h.p., 6 cyl., 113×125 (1100 r.p.m.) .....240 lbs.

Vertical, 2 cycle, water-cooled (pump).

H.T. magneto.
Rotary inlets.
Forced lubrication.

Features.—

2 carburetters.
Special magneto advance.
Babbit bearings.
Very large hollow crank shaft.
Special metal cylinders (aerolite).
Special by-pass.
Rotary inlets.



STURTEVANT.

B. F. Sturtevant Co., Hyde Park Boston, Mass.

40 h.p., 4 cyl., 113×113 (1300 r.p.m.) .....200 lbs.
60 h.p., 6 cyl., 113×113 (r.p.m.) .... 285 lbs

H.T. magneto (Mea).
Mechanical inlets.
Pressure feed lubrication.

Features.—

Semi-steel cylinders (jackets cast with them).
Single cylinders.
Single cam shaft.
No overhead valves.
Exhaust valve lifters.
Nickel steel hollow crank shaft (5 bearings in the 4 cyl., 7 in the 6 cyl.)

WELLES & ADAMS.
Wells & Adams, Bath, N.Y.

50 h.p., 4 cyl. ....200 lbs.

Vertical, water-cooled (pump).

H.T. magneto.
Mechanical inlets (overhead).
Forced lubrication.

Features.—

Single cylinders (large brass jackets).
Double plugs.
No valve cages.
Chrome nickel crank shaft, on 5 bearings.

WRIGHT.
The Wright Co., Dayton, Ohio.

30 h.p., 4 cyl., 112 × 100 (1650 r.p.m.).....190 lbs.
50 h.p., 6 cyl., 112 × 100 (1150 r.p.m.).....230 lbs.

Vertical water-cooled (pump).

H.T. magneto.
Rotary valves.
Pump lubrication.
Silencer fitted.

Note.

There are a good many other U.S. engines of little or no account. The majority of these are merely more or less accurate copies of well-known European engines, and none of them have any vogue.

AERIAL DIRECTORY & INDICES.

Note.—So far as possible the directory lists are exhaustive for the entire world. Anyone accidentally omitted is requested to communicate with the Manager, *All the World's Air-craft*, 5, Queen Victoria Street, London, E.C.

SUB-HEADS OF THIS SECTION.

DIRECTORY:

CARBURETTERS.
FABRICS.
GARMENTS FOR AVIATION.
HANGAR AND SHED BUILDERS.
INSURANCE.
LUBRICANTS.
MAGNETOS.
MISCELLANEOUS ACCESSORIES.
PACKERS AND SHIPPERS.
PATENT AGENTS.
PETROL.
PROPELLERS.
RADIATORS.

INDICES:

ALPHABETICAL AEROPLANES.
,, DIRIGIBLE TYPES.

CARBURETTERS.

AUSTRIAN-HUNGARIAN.

DENES FRIEDMANN, 11 Mitterbergasse, Vienna, XVIII.
ERBEN S., Wien I. Rosenbursenstr 4
PRÄZISIONS-KUGEL-LAGERFABR. G.m.b.H. "Sol x" Vergaser XX/1 Gerhardusg 27 Wien

BELGIAN.

DASSE (G.), 49 Rue David, Verviers
FAGARD (J.) & Cie, 7 Rue Bouille, Liege, (*Sthénos*).

BRITISH.

BROWN & BARLOW, Ltd., 16 Loveday Street, Birmingham
BURGESS (W. H. M.), 40 Glasshouse Street, London, W. (*White & Poppe*).
CARBURATION, Ltd., 85 Fleet Street, London, E.C.
CLAUDEL-HOBSON, 29 Vauxhall Bridge Rd., London, S.W.
DAVIS PARAFFIN CARBURETTER Co., London
FENESTRE, CADISCHE & Co., 17 Harp Lane, London, E.C.
MOSELEY MOTOR WORKS, Birmingham
SCOTT, ROBINSON, 3 Great Winchester St., London, E.C.
TRIER & MARTIN, Ltd., Trinity Works, New Church Road, Camberwell, London, S.E. (*T.M.*)
WAILES (George) & Co., 386-8, Euston Road, London, N.W. (*S.U.*)
WHITE & POPPE, Ltd., Lockhurst Lane, Coventry
WOODNUTT & Co., St. Helens, I.W.

FRENCH.

AMAC, 198, Boulevard Pereire, Paris
AMOUDRUZ, 24 Rue d' Armaillé, Paris. (Carburateurs "RV" et "Economie").
ARIS, 1, Rue Barbès Courbevoie, (Seine)
AUPIERE (Ch.), 95 Rue de Flandre, Paris
ATMOS, 3 bis, Rue Charcot, Neuilly-sur-Seine (Seine)
AVI-AUTO, 8, Rue de Sèze, Paris
BARIQUAND & MARRE (Société), 127 de Oberkampf, Paris
BARBET, 57, Rue Servan, Paris
BONNETEAU, 36, Rue de l'Amiral Roussin, Paris
BOURBIENNE, 4, Rue de la Trauche, Alfortville (Seine)
BREUZIN (Ed.) FILS, 26-28 Rue Morand, Paris
CAILLETTE ET NARÇON, 29 Rue de la Plaine, Paris
CANNEVEL, 17, Rue Rivay Levallois (Seine)
CARAMELLO, 6, Cité Dupetit-Thouars, Paris
CHANTAL, Lavalette pres St. Chamond (Loire)
CHARRON, Ltd., 7 Rue Ampère, Puteaux (Seine)
CLAUDEL (Henri), 41 Rue des Arts, Levallois-Perret (Seine)
CHAUFFOURIER, 8, Rue de Palikao, Paris
CLERC & QUANTIN, 21 Rue Tandou, Paris
COTTIN & DESGOUTTES, Place de Bachut, Lyon (Rhone)
COUTET 12, Rue Lacuée, Paris
DAVIS, 5, Rue du Pré Saint Gervais, Pantin (Seine), 11, Avenua de l'Opéra, Paris
DETAINT, 177, Quai de Valmy, Paris
DONAUD, Rue de la Pelletterie, Nantes (Loire Inférieurs)
EDELWEISS, 29, Rue Tronchet, Paris
FAUCON, 51, Rue Servan, Paris
FILL, 23 ter, Boulevard d'Inkerman, Neuilly-sur-Seine (Seine)
FILTZ (J.), 13 Avenue du Roule, Neuilly-sur-Seine (Seine)
GAUDON, 29, Place D'Italie, Paris
GITS, 52, Rue Cosserat, Amiens (Somme)
GOBBI, 33, Rue de Villiers, Neuilly-sur-Seine (Seine)
GOUDARD & MENESSON, 29, Rue Forquet, Levallois (Seine)
GROUVELLE (J.) H. ARGUEMBOURG & Cie, 71 Rue du Moulin-Vert, Paris. ("*G. A.*")
HARDING (H. J.), 7 *bis*, Rue du Débarcadere, Paris. (*J.A.P.*)
"JARNAC," 88, Rue des Plantes, Paris
JOLY FRÈRES, 244 Rue Marcadet, Paris
LANGERON, La Guerche-sur-Aubois, (Cher.) 13, bis, Rue de Cormeille, Levallois (Seine)
LAURENT FRÈRES, Plandher-Les-Mines (Haute Saone)
LEMERCIER & Co., 8, Rue Geoffooy-Marie, Paris
LONGUEMARE (F. & G.) FRÈRES, 12 Rue du Buisson-St-Louis, Paris
MAUVILLIER, 8, Rue Bayan, Paris ("M.O.B.")
MENEVEU & Cie, 15 Rue des Trois-Bornes, Paris
MERIOT (L.), 22 *bis*, Rue de' Taillandiers, Paris
"MINIMAX," 88, Rue Robert, Lyon (Rhone)
MESTRE & BLATGE, 46, Avenue de la Grande Armée, Paris
"NERVAX," 197, Rue Saint Charles, Paris
NOURY & ALLAIN, 14, Rue Oberkampf, Paris
PANHARD-LEVASSOR (Etablissements), 19 Avenue d'Ivry, Paris
PIAT, 85 Rue Saint Maur, Paris
PILAIN (Soc.), 17 Chemin de Monplasir à Grange-Rouge, Lyon (Rhone)
ROTHERNEL, 21, Rue Washington, Paris
ROUQUETTE, 226, Rue Lafayette, Paris
STEINMETZ, 43, Avenue de la République, Paris
"STHENOS," 1, Rue Saint Georges, Paris
STORM, à Juilly (Seine-et-Marne)
"S.U." 13, Quai de Granelle, Paris
THUROT, 10, Rue le Florence, Paris
TOUCHET et DUPIEUX, 29, Rue de la Chapelle, Paris
TRABET, 1, Rue Amelot, Paris ("Le Central")
'VAPON," 6 Rue de l'Ouest, Neuilly-sur-Seine (Seine), 18, bis, Rue Brunel, Paris.
ZENITH (Soc. du Carburateur) { 55 Chemin Feuillat, Lyon-Monplasir (Rhone) 115, Rue du Débarcadère, Paris

GERMAN.

ALBERTUS & STEGEMÜLLER, Metallwarenfabr. Eisenburg S.-A.
BIERIG, Arno, Armst. Fabrik. Vergaser. Leipzig-Lindenau
CUDELL-MOTEREN-GES. m.b.H. Vergaser N. Reinickendorferstr 46 Berlin
FAVORIT-VERGASER Ges. m.b.H. W. Linkstr 11, Berlin
HECHT & KOEPPE, Blucherplatz 1, Leipzig
METALLWARENFABR. "Ideal" g.m.b.H. Opladen i. Rhid
PALLAS VERGASER G.m.b.H. Wilmersdorferstr 85, Berlin-Charlottenburg
PETIT H. Henry, Madchinen Fabrik Vergaser, W. Eilenа a.E.
PRERAUER & HENRICH, S. Kottbuser Damm 45, Berlin
"RAPID"-ACCUMULATOREN u. MOTOREN WERKE G.m.b.H. Hauptstr 9, Berlin-Schoneberg
SCHMITZ & Co., J., Homburgerstr 13, Hochst a.M.
WEIDNER Richard, Metallwarenfabr, Eisenbahnstr Kat. Nr. 160 Leipzig Sellerh. Berlin-Halensee
ZENITHVERGASER G.m.b.H.
ZULAUF & Co., Hochst a.M.

SWISS.

METALLGIESSEREI & ARMATURENFABR. Lyss
SCHWEIZ. Werkzeugind. Ges. Katz & Co., Freiestr 103, Basel
WAGNER (Soc. d' Ind., Suisse d'Outillage), Bate

U. S. A.

BECKLY RALSDON, 178 Lake Street, Chicago
BREEZE CARBURETTER Co., 276 Halsey Street, Newark, N.Y.
BUFFALO CARBURATOR Co., 887 Main Street, Buffalo, New York
BYRNE, KINGSTONE & Co., Kokomo, Ind.
GOLDBERG MOTOR CAR DEVICES MFG. Co., 1253 Michigan Avenue, Chicago
HEITGER CARBURETTER Co., 205 West South Street, Indianopolis
HOLLEY Bros. Co., 661 Beaubien Street, Detroit, Mich.
KALAMAZOO CARBURETTER Co., Kalamazoo, Mich.
MARVEL MANUFACTURING Co., 410 S. Meridion Street, Indianopolis
MYERS (A. J.), 244 West 49th Street, New York. (*G. & A.*)
SPEED CHANGING PULLEY Co., 788 Washington St., Indianopolis. (*Speed*).
STROMBERG MOTOR DEVICES MANUFACTURING Co. 1253 Michigan Avenue, Chicago, London, D.S. (*T.M.*)
WESTERN MOTOR Co., Logansport, Ind.
WHEELER & SCHEBLER, Indianopolis

FABRICS FOR AEROPLANES AND DIRIGIBLES.

AUSTRIAN-HUNGARIAN.

METZELER & Cie, 6 Konigstrasse (Gummihof), Vienna VI.
MOTORFAHRZEUG Ges. m.b.H. XIII, Hutteldorferstr 74 Wien
OESTERR. Siemens Schuckert Werke Mariahilferstr 7 Wien

BELGIAN.

DUPT (A. D.), 11 Avenue de Keyser, Antwerp
ENGLEBERT FILS & Cie, 29 Rue des Vennes, Liege

BRITISH.

ACCORDION BOAT Co., 32 Tufton St., Westminster, London, S.W.
"AEROPLATTE." (See Rogers Bros.)
AVON INDIA RUBBER Co., Ltd., Melksham, Wilts
BENETFINK & Co., Ltd., Cheapside, London, E.C.
CLARKE (T. W. K.) & Co., Kingston-on-Thames
CONTINENTAL TYRE & RUBBER Co., (GREAT BRITAIN) Ltd., 102 Clerkenwell Road, London, E.C.
CROSVILLE MOTOR Co., Ltd., Crane Wharf, Chester.
DUNLOP RUBBER Co., Ltd., Manor Mills, Aston, Birmingham
FRANKENBURG & Sons, Ltd., Salford, Lancashire
"HARTS," 21 Liverpool Street, E.C.
HUTCHINSON AERO CLOTHS, 70 Basinghall Street, London, E.C.
IOCO PROOFING Co., Ltd., 80, Fraser Street, Bridgeton, Glasgow
IMPERIAL TYRE & RUBBER Co., Brook St., Holborn, London, W.C.
JONES (Bros., Ltd.), 12 York Street, Manchester.
MCLEAN, MCLEAN & Co., 79 Gracechurch St., London, E.C.
NEW MOTOR & GENERAL RUBBER Co., Ltd., 374 Euston Road, London, W.C.
NORTH BRITISH RUBBER Co., Ltd.:—
1 Long Acre, London, W.C.
Castle Mills, Edinburgh
PECAMOID (NEW) Ltd., 144 Queen Victoria Street, London, E.C.
ROE (A. V.) & Co., Brownsfield Mills, Manchester
ROGERS (Bros.), 1 Mitre Court, Milk Street, London, E.C. (*"Aviator" Ramie*), (*Aeroplatte*)
SPENCER (C. G.) & Sons, 56a, Highbury Grove, London, N.

DANISH.

CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., 28 Amaliegade, Copenhagen

DUTCH.

CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., 1077 Prinsengracht, Amsterdam

FRENCH.

ALBERTI (L.) *(Harburg-Wien)*, 12 Rue d'Enghien, Paris
AERA, 16, Avenue de la Grande Armée, Paris.
BARBET, MASSIN, POPELIN & Co., 5 Rue Saint Fiacre, Paris.
BESSONNEAU, 21 Rue Louis Gain, Angers
BOUVET & D. COUTEAU, 103, Rue Lafayette, Paris.
BOYRIVEN & CO., 116, Rue Lafayette, Paris.
CAOUTCHOUC Manufacture (Soc. du.), 88 Rue Notre Dame-de-Nazareth, Paris
CENTRAL AERO, 89, Avenue des Ternes, Paris.
CONTINENTAL, 146 Avenue Malakoff, Paris
DEVILLE (J.), 42 Rue des Jeuncurs, Paris
DUNLOP, 4 Rue du Colonel Moll, Paris
FALCONNET PERODEAUD (Etablissements), 4, Place Carnot, Chossy-le-Roi
GODARD (Etablissements Louis), 170 Rue Legendre, Paris
GUERIN, VERET, BESSIERE & Co., 9, Rue d'Uzes, Paris
HOERDER, 92 Boulevard Richard-Lenoir, Paris
HUTCHINGSON (Etablts.) 60, Rue Saint-Lazare, Paris
JUCHMES, 41, Rue Pasteur, Suresnes (Seine)
MAUVE, 15, Rue des Acacias, and 2, Rue du Colonel Moll, Paris
METZELER & Cie, 1 Rue Villaret-de-Joyeuse, Paris
MICHELIN & Cie, 105 Boulevard Pereire, Paris (Usines à Clermont-Ferrand)
OPPENHEIMER, NEVEU, 28 Rue Bergère, Paris
PALMER, 150, Avenue Malakoff, Paris
PELAVY, 47 Rue Saint Ferdinand, Paris
PETER (Louis), 107 Rue de Courcelles, Paris
POLINO, 27, Rue du Grand Prieuré, Paris
RUSSIAN-AMERICAN INDIA RUBBER Co., 47 Rue St. Ferdinand, Paris
SULFIMATE (Service du), 200 Boulevard Victor Hugo, Clichy (Seine).
TELEPHONES (Soc. Indle. Des.), 25 Rue de Quatre Septembre, Paris
TORRILHON (Soc. An. des Anciens Etab. J. B.), Clermont Ferrand
TREUGOLK (Société Française), 13, Rue des Frères Herbert Levallois
VALDENAIRE, ADENEL & Co., 21 Rue des Jeuncurs, Paris
WALRAND & CO., 8, Rue du Caire, Paris
ZODIAC (Société) 10, Route du Havre, Puteaux (Seine)

GERMAN.

CLOUTH (Franz) (Rheinische Gummiwaarenfabrik, Cologne-Nippes
CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., 100 Fahrenwalderstrasse, Hamburg
LANZ, Heinrich, Madchinenfabrik, Mannheim
LUFTFAHRZEUG Ges m.b. H. Luftschiffe Syst Parseval W. 62 Kleistr 8, Berlin
LUFTSCHIFFBAU ZEPPELIN G.m.b.H. Friedrichshafen a Bodensee
MICHELIN & Cie, Frankenalle 4, Frankfort
RIEDINGER Aug. Ballonfahr, G.m.b.H. Eisenhammerstr 23, Augsburg
RUTHENBERG, Hermann, Lehderstr 16/19, Berlin-Weissensee
SIEMENS SCHUCKERT WERKE G.m.b.H. Werkstatten Biesdorf b. Berlin, Berlin-Siemensstadt

ITALIAN.

CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., 36 Via Bersaglio, Milan
MICHELIN & Cie:—
117 Via Livorno, gia via Schina, Turin
14 via Toro, Milan

RUSSIAN.

CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., 11 Boischaja Dmitrovka
RUSSIAN-AMERICAN INDIA RUBBER Co., Tregolnik, 138, Canal Abovdny, St. Petersburg

SPANISH.

CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., 5 Calle Fernando el Santo, Madrid
MICHELIN & Cie, 21-23 Calle Sagasta, Madrid

SWEDISH.

CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., Riddoregatan 15, Stockholm

SWISS.

CONTINENTAL CAOUTOUCHOUC & GUTTA PERCHA Co., 9 Lowenstrasse, Zurich

U. S. A.

BALDWIN (Captain Thos. S.), Box 78 Madison Square, New York
CONOVER (C.E.) & Co. *(Naiad)*, 101 Franklin Street, New York
CONTINENTAL CAOUTOUCHOUC & GUTTER PERCHA Co., Muskegon, Mich.
FRENCH AMERICAN BALLOON Co., 4460 Chouteau Avenue, St. Louis
GOODYEAR TIRE & RUBBER Co., Akron, Ohio
MICHELIN & Cie, Milltown (N. T.).
"NAIAD," 101 Franklin Street, New York
STEVENS (Aeronaut Leo), Box 181, Madison Square, New York

GARMENTS FOR AVIATION.

AUSTRIAN.

BALAN & CO., Sportmutzen Amerlingstr 19, Wien
BAUR (R.), 4 Rudolfstrasse, Innsbruck

BSLINGER & SOHNE, M.J. k.k. priv. Fabr. & Webereien Regenmantel I., Volksgartenstr 1 Wien

GOLDMAN & SALATSCH, 20 Graben, Vienna I.

HAHN, Alfred, Gamsschen, Zieglergasse 7, Wien

MAKOVSKY & Co., 9 Baumannstrasse, Vienna

POHLE & CO., Henry, Sportbekleidung, Karntner Ring 17, Wien

SKARDA, Wilh. Hofl. Sportbekleidung, Karntner Ring 37, Wien

BELGIAN.

DEPART (Au), 8 Boulevard Anspach, Brussels

GAUSSET (F.), 5 Rue du Jardin Botanique, Liege

HOEBER & Cie, 48 Chemin de Hall, Forest-les-Brus

REEKIE (A.), 17 Rue Royale, Brussels

BRITISH.

AEROPLANE SUPPLY Co., Ltd., 111 Piccadilly, London, W.

BAKER & Co., Ltd., 137 Tottenham Court Road, London, W.C.

BURBERYS { 30-33 Haymarket, London, S.W. / Basingstoke

DUNHILL (A.), Ltd., 359 Euston Road, London, N.W.

GAMAGE (A. W.), Ltd., 126 Holborn, London, E.C.

HARROD'S STORES, Ltd., Brompton Road, London, S.W.

JOHNSTON (G.) & Co., 110 Cannon Street, London, E.C.

NICOLL (H. J.) & Co., Ltd., 114 Regent Street, London, W.

NORTH BRITISH RUBBER Co., Ltd., Castle Mills, Edinburgh

PENTON (E.) & Son, 11 Mortimer Street, London, W.

PIGGOTT (J.), Ltd., 117 Cheapside, London, E.C.

ROGERS (Bros.), 1 Mitre Court, Milk Street, London, E.C. (*Mascot vests*), (*Aeromac*)

SAMUEL (Bros.), Ltd., 65 Ludgate Hill, London, E.C.

SMEE (B.), 403 Oxford Street, London, E.C.

FRENCH.

ABERDEEN, 1 Rue Auber, Paris
ARNOUX, 63 Boulevard Malesherbes, Paris
AUDOUARD, 3 Rue du Commandant, Rivière, Paris
AUX MARINS, 7 Avenue de la Grande-Armée, Paris
AUX PHARES DE L'OUEST, 89, Avenue du Maine, Paris

BARBAN, 67 Rue Rambuteau, Paris
BAZAR DE L'HOTEL DE VILLE, 54 Rue de Rivoli, Paris
BELLE FERMIERE (La), Rue Saint-Pierre, Caen (Calvados)
BELLE JARDINIERE (La), 2 Rue du Pont-Neuf, Paris
BERNARD, 153 Rue du Faubourg, Saint-Honoré, Paris
BINET (E.), 6 Boulevard Diderot, Paris
BLUET, 154 Boulevard Haussmann, Paris
BOLLAU (M.), 5 Rue d'Tory, Lyon
BOINET (G.) & Cie, Saint-Quentin (Aisne)
BON MARCHE (Le), Rue de Sèvres, Paris
BONNET (G.), 4 Rue de la Bastille, Paris
BONNIOL, 10 Rue Turbigo, Paris
BOROWSKY, 32 Rue d'Argout, Paris
BOURSIN, 61 Rue la Boétie, Paris
BRUNSCHWIG (Ch.), 39 Rue des Bourdounais, Paris
BURBERYS, 10 Boulevard Malesherbes, Paris
BUSSEY (Geo. C.) & Cie, 25 Rue Tronchet, Paris
BUSVINE & Cie, 4 Rue Marbeuf, Paris

CAOUTCHOUC MANUFACTURE (Société du), 86 Rue Notre Dame de-Nazareth, Paris
CARNAVAL de VENISE (Au), 5 Boulevard de la Madeleine, Paris
CHAMANSKY & BLOCH, 6 Place des Victoires, Paris
CHOCQUENET (V.), 31 Rue des Jeûneurs, Paris
CHOTIN (G.), 34 Rue Montmartre, Paris
CIRET (F.) & Cie, 140 Rue Rivoli, Paris
COOK & Cie, 23 Rue Auber, Paris
CRABETTE, 54 Faubourg Saint-Honoré, Paris

DAMERVAL (A.), 9 Rue Réaumur, Paris
DAROLES-VINCENT, 22 Rue de Faubourg-du-Temple, Paris
DAY, 162 Rue du Faubourg-Saint-Martin, Paris
DEITZ (E.), 56 Rue d'Aboukir, Paris
DENIAU & Cie, 86 *bis*, Rue de Rome, Paris
DEWACHTER, 83 Boulevard Voltaire, Paris
DUGAS, Freres, 10 Boulevard Sébastopol, Paris
DUBESSY (J.), Villefranche (Alpes Maritimes)
DUROT & LÉRY, 25 Rue des Trois-Cailloux, Amiens
DUBREUIL & PARMENTIER, 34 Rue Montorgueil, Paris

EGGER & Cie, 2 Rue de la Vrillière, Paris
ESDERS (Maison Henri), 118 Rue Montmartre, Paris
EXCURSIONISTES (Aux) Avenue de la Grand Armée, Paris.

FASHIONABLE HOUSE, 16 Boulevard Montmarter, Paris
FELDSTEIN, 91 Rue des Marais, Paris
FRAENKEL (H.), 28 Rue du Quartre-Septembre, Paris 60 Avenue de la Grand Armée, Paris

GALERIES LAFAYETTE (Aux), 40 Boulevard Haussmann, Paris
GRANDE MAISON (A La), 7 Rue Croix-de-Petits-Champs, Paris

HALIMBOURG-AKAR (Etablissementes, 1 Places de Victoires, Paris
HENRY-TREILLE, Marcigny (Saone & Loire)
HIGH-LIFE, Tailor, 112 Rue de Richelieu, Paris
HUTCHINSON (Etablissements), 60 Rue Saint-Lazare, Paris

KRIEGCK & Co., 23 Rue Royale, Paris

LACHASSAGNE (E.), 16, Rue Chapelon, Saint-Etienne (Loire)
LAMBLIN (A.), 15 Rue Tiquetonne, Paris
LAMARTINE, 24 Rue des Bons-Enfants, Paris
LECONGE & WILLMANN, 2 Rue du Renard, Paris
LEON, 21 Rue Daunou, Paris
LÉRY, 25 Rue des Trois Cailloux, Amiens (Somme)
LOUVRE (Grande Magazines du), 164 Rue de Rivoli, Paris
LYON (Grand Bazaar de), 31 Rue de la République, Lyon (Rhone)

MAGNANT & Cie, 117 Rue Réaumur
MAGNE (A.), Moulins (Allier)
MANBY, *Ies* 19 Rue Auber, Paris
MARCHAL (M.), 30 Rue le Peletier, Paris
MARECHAL (A.), Nevers (Nievre)
MAX-AUSPITZ, 374 Rue Saint-Honoré, Paris
MICHEL JACKSON (A.), 92 Rue Richelieu, Paris
MICHEL JACKSON (E.), Halluin (Nord)
MENAGERIE (A la), 20 Boulevard Borne-Nouvelle, Paris
METTEZ (Maison), 5 Place de l'Hotel de Ville, Paris
MOLAY (dacquest), 181 Rue du Temple, Paris
MATHAN (G.), 27 Rue Saint-Sabin, Paris

NATHAN (G.) 87, Rue de la Chapelle, Paris
NICOLLE, 29 Rue Tronchet, Paris

OLD ENGLAND { 12 Boulevard des Capucines, Paris / 114 Via Nazionale, Milan, Italy
OLIVIERI & Co., 101 Rue Claude-Decaen, Paris

PAGUIN (J.) BERTHOLLE & Cie, 43 Boulevard des Capucines, Paris
PARIS-TAILLEUR, 3 Rue du Louvre, Paris
PAYEN (Maison G.), 7 Rue de la République, Lyon (Rhone)
PETIT MATELOT (Au), 41 quai d'Anjou, Paris
PFEIFER-BRUNET, 17 Rue de l'Ancienne-Comedie, Paris
PRINTEMPS (Magasius du), 70 Boulevard Haussmann, Paris

JOUENEAU, 25 Avenue de la Grande-Armée, Paris
RÉAUMUR (A.), 82 Rue Réaumur, Paris
REVILLON, Freres, 77 Rue de Rivoli, Paris
RIBBY, 16 Boulevard Poissonière, Paris
RICOLR, 26 Rue du Bouloi, Paris
RODDY, 2 Boulevard des Italiens, Paris
ROFFY, 2 bis, Rue du Bouloi, Paris
ROOLD, 50, Avenue de la Grand Armée, Paris
ROUSSEAU, 61 Passage du Havre, Paris
ROYAL TAYLOR, 41 Avenue de Wagram, Paris
RUSSIAN AMERICAN INDIA RUBBER Co., 47 Rue Saint Ferdinand, Paris
SAINT, FRERES, 34 Rue du Louvre, Paris
SAMARITAINE, Rue du Pont-Neuf, Paris
SEYNOHA (F.), 249 Rue Saint-Honoré, Paris
"SIEG," 19 Avenue de la Grande-Armée, Paris
SORIN & MARZETTIER, 2 Rue Haudaudine, Nantes, (Loire Inférieure)
SPORT (The), 17 Boulevard Montmartre, Paris
STEINMETZ, Freres, 16 Rue Cambronne, Paris
STROM (D. SCHNEIDER & Cie) { 16 Rue de la Chaussée-d'Antin, Paris / 33 Avenue de la Gare, Nice (Alpes Maritimes)
TELEPHONE (Societe Industrielle des), 25 Rue du Quartre Septembre, Paris
THIERY & SIGRAND, 18 Boulevard Sébastopol, Paris
TORRILHON (J. B.), Chamalieres
TROIS-QUARTIERS (Aux), 17 Boulevard de la Madeleine, Paris
TUNMER (A.) & Co., 27 Rue du Quartre-Septembre, Paris
VELOCE-CLUB (Au), 21 Avenue de la Grande-Armée, Paris
VINCENE, 148 Rue du Temple, Paris
VOLLANT (A.), 23 Rue Meslay, Paris

WEST END TAILORS, 10 Rue Auber, Paris
WILLIAMS & Cie, 1 Rue Caumartin, Paris

GERMAN.

ANWANDER (A.), 22 Sonnenstrasse, Munich
ADAM S. SPORTBEKLEIDUNG, W. Leipzigerstr 27/28 Berlin
ANWANDER ANTON, Hfl. Sportbekleidung, Sonnenstr 22, Munchen

BAMBERG & HERTZ, Sportbekleidung, Zeil, Frankfurt, a.M.
BENDICT, G., Sportbekleidung, W. Koniggratzerstr. 10, Berlin

ENRICH, Alb. Deutsches Moden & Sport-Haus, W. 66 Mauerstr 95 Berlin
ESDERS & DYCKHOFF, Sportbekleidung, Gertraudenstr 8/9, Berlin

GERSON, Herrmann, Hofl. Sportbekleidung, W. Werderscher Markt 5/6 Bln.
GLASS & WELS, Sportbekleidung, Marienstr 1b, Wilhelmsbau, Stuttgart

HARTMANN Wilh. Hofl. Sportbekleidung, Kaiserstr. 25 Frankfurt, a.M.
HERTZOG (R.), 15 Breiterstrasse, Berlin
HERTZOG Rudolph, Sportbekleidung, C. Breitestr 12/19 Berlin
HOFFMANN Herrmann, Sportbekleidung, Friedrichstr 50/51 Berlin

LEINEWEBER Berard, Sportbekleidung, C. Kolln. Fisch-Markt 4/8 Bln.

ULRICH Aug. Hofl. Sportbekleidung Kaiserstr. 62, Frankfurt a.M.

VEREINIGTE Gummiwaren Fabr. Harburg Wien A.G. Vorm Menier-Harburg A.E.

ITALIAN.

MARTINY (Manufacture), 5 Via Pietro Micca, Turin

SANGUINETTI (Frat.), 8 Corso Vittorio Emanuele, Milan

SPANISH.

SANCHA (M.), 12 Calle de la Cruz, Madrid

SWISS.

BOMMER & KELLER, Sportbekleidung, Gessnerallee 32, Zurich
BURGER KEHL & Co., Sportbekleidung, Zurich

GEISTDORFER & Co., 4 Paradeplatz, Zurich

SPORTMAGAZIN Martin Huber In Gassen 11 Zurich

U.S.A.

SCANDINAVIAN FUR & LEATHER Co., 16 West 33rd Street, New York

HANGAR AND SHED BUILDERS.

BRITISH.

AEROPLANE SUPPLY Co.,Ltd., 111 Piccadilly, London,W.
HARBROW (W.), South Bermondsey Station, London, S.E.
HARRISON, SMITH Buildings, Ltd., Vauxhall Works, Dollinan Street, Birmingham.
HUMPHREYS Ltd., Knightsbridge, London, W.
MORTON, FRANCIS & Co., Ltd., Hamilton Ironworks, Garston, Liverpool.
PICCOTT, Bros. & Co., Ltd., 220, 222, 224, Bishopsgate, London, E.C.
SMITH (F) & Co., Carpenters Road, Stratford, London, E.
WIRE-WOVE ROOFING Co. & PORTABLE BUILDINGS Co., 108 Queen Victoria St., London, E.C.

FRENCH.

BESSONNEAU { 29 Rue du Louvre, Paris
21 Rue Louis Gain, Angers
CHAMPLY, 7, Rue Tarlieu, Paris
CLEMENT-BAYARD, 33, Quai Michelet, Levallois (Seine)
COL, Route de Lyon, Moulins (Allier)
COMPAGNIE AERIENNE, 63, Avenue des Champs, Elysées, Paris
CONSTRUCTIONS DEMONTABLES (Compagnie des), 54 Rue Lafayette, Paris
CONSTRUCTIONS ECONOMIQUES (Société de), 11 Avenue de l'Opera, Paris
DUBOIS et Cie, 7 Rue Saint-Amand, Paris
DUMOTIER, 5 Rue Pleyel, Paris
HERVIEU (Société des hangars système) 9 Rue Edouard Nieuport, Sureness
LEPRON, 24 Rue Pradier, Paris
LIEVRE, 68 Quai de la Care, Paris
LAPEYRERE (L.), 80 Rue de l'Eglise, Paris
OFFICE d'AVIATION, 3 Avenue de l'Opera, Paris Street, London, E.C.
PERBAL, 8, Rue Saint Jean, Nancy
RUBEROID (Société du), 88 Boulevard Beaumarchais, Paris
SAINTE-BEUVE (A.), 196 Quai Jemmapes, Paris
VINANT (Société des Etablissements) 69, Rue Cambronne, Paris

GERMAN.

BALLONHALLENBAU (Arthur Muller) Ges. m.b. H. Fritschestr 7/28 Berlin-Charlottenburg
BEHRENS F., & A. KUHNE, Oschersleben a. D. Bade
BOTTCHER & KLEEMANN, Schleusen-Hallen-und Industrie-Bauten G.m.b.H. SO, Schmidstr 8 Berlin
BUSS & CIE Albert, Akt.-Ges. Wyhlen i. Bad
CHRISTOP & UNMACK a.G. Luftschiff & Flugerhallen, Niesky, O.L.
DIETRICH W. umlegbare Luftschiffhallen, Alte Bischofsholerstr 9 Hannover
DYCKERORFF & WIDMANN A.G. Karlsruhe i. Bad
FONTANA Maste u. Trager-Ges. m.b. H. SW. Bernburgerstr 24/25 Berlin
GESELLSCHAFT "Stenhansdach" G. m.b. H. Ulmenstr 18
GUILLEAUME-WERKE A.-G. Neustadt a.d. Haardt
HALLEN-UND SCHEUNENBAU Carlstr 6 Dusseldorf
MASCHINENFABR, Augsburg-Nurnberg A.G. Augsburg
MULLER (A.), 27 Fritcherstrasse, Berlin-Charlottenburg
VON HOVEL, A. Abt.

HYDROGEN SUPPLIES.

AUSTRIAN-HUNGARIAN.

OESTERR. Ung. Sauerstoffwerke G. m.b. H. 1V Gusshaustr 30 Wien

BRITISH.

BRITISH OXYGEN Co., Ltd.:—
Elverton St., Westminster, London, S.W.
Saltley Works, Birmingham
Great Marlborough St., Manchester
Boyd St., Newcastle-on-Tyne
Roschill Works, Polmadis, Glasgow
KNOWLES' OXYGEN Co., Ltd., Wolverhampton.
WOLF (J.), 15 Seething Lane, London, E.C.

FRENCH.

AEROSTATION & L'INDUSTRIE (Hydrogène pour l') Avenue Bernard Palissy, Saint Cloud (Seine & Oise)
AIR LIQUIDE (L') 48, Rue Saint-Lazare, Paris (Oxygene)
ASTRA (Constructions Aeronautiques) 13, Rue Couchot, Billancourt (Seine)
Works: Issy-les-Moulineaux (Nr. Paris) (Hydrogen)
ASTRA (Pitares) 14 Rue Pergolese, Paris (Oxygen)
BARDOT, 274 Rue Lecourbe, Paris (Oxygen)
CLEMENT-BAYARD, 33 Quai Michelet, Levallois (Seine)
Works: Issy-Les-Moulineaux (Nr. Paris) (Hydrogen)
ELECTROLYSE FRANCAISE (L'), 4 Rue des Ecluses, Saint Martin, Paris
75, Roate de Flandre, Le Bourget (Seine)
HYDROGENE (Societe Anonyme L') 128 Rue Lafayette, Paris
HYDROGÈNE pour l'Aerostation et l'Industrie (Soc. Francaise de l') (Lane's System), Boulevard Senart, St. Cloud (Seine et Soisel).
HYDROXYGENE PUR { (Au Marais de l'Homme, Lille (Nord)
22 Rue de Douai, Paris

OXYHYDRIQUE FRANCAIS, 54 Rue Philippe de Girard, Paris
OXYLITHE, 138 Rue Victor Hugo, Levallois-Perret (Seine)
PRODUITS CHIMIQUES (Societe Industrielle de), 10, Rue de Vienne, Paris
Lamotte-Breuil (Seine & Oise)
ZODIAC (Societe) 10, Route du Havre, Puteaux (Seine)
Works: Saint-Cyr-l'Ecole (Seine & Oise)

GERMAN.

CARBONIUM G.m.b.H., Offenbach A.M.
CHEMISCHE Fabrik Griesheim-Electron A. G., Bitterfeld
CHEMISCHE Fabrik Griesheim-Electron A.G. Griesheim b. Frankfurt a. M.
DEUTSCHE CONTINENTAL GAS GESELLSCHAFT Ballongas, Dessau
DEUTSCHE SAUERSTOFF WERKE G.m.b.H. Breitestr 20 Dusseldorf
GERLING HOLZ & COMHOLSTENSTR 222 Altona, Elbe
INTERNATIONALE WASSERSTOFF A.G. Marienstr 8, Frankfurt a. M.
WASSERSTOFFABRIK, Gersthofen b. Augsburg
WASSERSTOFF SAUERSTOFF WERKE G.m.b.H. Schwarzenberg Sa.

INSURANCE (AVIATION).

AUSTRIAN-HUNGARIAN.

AUTO HAFTVERSICHR, Akt.-Ges. Bibcfstr 17 Wien
ERSTE OESTERR. ALLG. URFALL VERSICHER. Ges. I., Bauermarkt 3 Wien
K. K. PRIVIL. VERSICHERUNGS Ges. "Oesterr. Phonix," I., Riemerg 2 Wien
MANNHEIMER VERSICHR. Ges. Mannheim, Fil. f. Oesterr. Ung. I., Schottenbastei 6 Wien
NORTH BRITISH AND MERCANTILE INSURANCE COMP. I., Gonzagaga 15 Wien
PROVIDENTIA ALLG. VERSICHERUNGS'Ges. in Wien I., Dominikanerbastei 21 Wien

BELGIAN.

MONET (Alfred), 3 Avenue de Cortambert, Bruxelles, Belgium

BRITISH.

AEROPLANE SUPPLY Co.,Ltd., 111 Piccadilly, London,W.
BRAY, CIBB & Co., Ltd., 14 Sherborne Lane, King William Street, London, E.C.
CAR & CENERAL INSURANCE CORPORATION, Ltd., 1 Queen Victoria Street, London, E.C.

DOLAMORE (W. T.), AVIATION INSURANCE BROKER, 199 Piccadilly, W.

FORBES (M. W.) & Co., 15 Queen Street, London, E.C.

GOLD (Guy), 1 Cornhill, London, E.C.

INNOCH (D. A.), 13 Leadenhall Street, London, E.C.

WHITE CROSS INSURANCE ASSOC., 1 Cornhill, London, E.C.

FRENCH.

ABEILLE (L') 57, Rue Taithout, Paris
ACCIDENTS DU TRAVAIL, 3 Rue de Lutèce, Paris
ACCIDENTS (Co. Cie d'Assurances contre les Accidents) 89, Rue de l'Arcade, Paris
ASSURANCES GENERALES, 87, Rue Richelieu, Paris
ASSURANCES MUTUELLES (Caisse d') 6, Rue d' Athènes, Paris
ASSURANCE SPECIALES d'AUTOMOBILES (Les) 29 Rue St. Georges, Paris

BAUDU DE CHANTEPIE (Ch.), 8 Rue Blanche, Paris (Seine)

CASAL & MULABON, 29 Rue de Londres, Paris
CAPRON & HAREL, 10 Rue Viollet-le-Duc, Paris
CASANOVA ET GRIBAUMONT, 50 Boulevard Maiesherbes, Paris
CAUBERT ET GARNIA (E.), 8 Rue Moreau, Saint-Dens, (Seine)
CONCORDE (La), 82 Rue Saint-Lazere, Paris
CONTINENTAL LLOYD, 8 Rue Laffitte, Paris
CONTRE-ASSURANCE (Société Générale de) 14 Rue Favart, Paris

DES LAURIERS & DUMONT, 43 Rue Laffitte, Paris
ENGLISH & FOREIGN INSURANCE CO., LTD., 14 Place du Havre, Paris
EUROPE (L') 50 Boulevard Haussman, Paris

FASTINGER (L.), 50 Rue Meslay, Paris
FONCIERE (La), 48 Rue Notre-Dame-des-Vistoires, Paris

GALLIA, 80 Rue de Rivoli, Paris
GOUIN, 12, Rue Grange, Batelieri, Paris
GRESHAM FREE & ACCIDENT, 5, Rue de la Victoire Paris
HANCIAN (G.), 59 Rue de Chateaudun, Paris

HELVETIA, 16 Rue des Pyramides, Paris
HUBT DE BAROCHEZ, 84 Boulevard des Batignolles, Paris
HURET (G.), 56 Rue d'Amsterdam, Paris

LAURIERS (Des) et DUMONT, 43 Rue Lafitte, Paris
LAW-CAR, 42 Rue Pergolèse, Paris
LE CHARTIR ET DARDONVILLE, 89, Rue de la Pompe, Paris
LEFEVRE, 7 Rue Villaret-de-Joyeuse, Paris
LLOYD ANGLO-FRANCAIS, 55 Rue Taitbout, Paris

MORGAN & Co., 9 Rue Sainte-Anne, Paris
MULLER, 26 Rue Etienne-Marcel, Paris
MUTUALITE (La), 46 Rue de Provence, Paris
MUTUALITE INDUSTRIELLE (La) 6 Rue d'Athenes, Paris
MUTUELLE ACCIDENTS (La) 49 Rue Peletier, Paris

NICOLLEAU, 78, Boulevard Ornano, Paris

OMNIUM DES ASSURANCES TERRESTRES, 59 Rue de Chateaudun, Paris

PHENIX (Compagnie) Francaise du) 33 Rue Lafayette, Paris
PHENIX ESPAGNOL, 59 Rue de l'Arcade, Paris
PIEDFER (G.), 92 Boulevard Richard-Lenoir, Paris
POUJADE, 35, Rue du Rome, Paris
PRESERVATRICE (La), 18, Rue de Londres, Paris
PREVOYANCE (La), 23 Rue de Londres, Paris
PROVIDENCE (La), 56 Rue de la Victoire, Paris

QUIRENET, 12, Rue Matignon, Paris

REUNION FRANCAISE (La), 41 Rue Vivienne, Paris
ROUSSELET, 49 Rue Berger, Paris

SOUDEILLETTE, 1 Rue Therese, Paris
STEVENS, 14 Rue de la Victoire, Paris

TERRIER, 81 Boulevard Sébastopol, Paris
TROLLET (H.), 131 Rue de Rome, Paris

UNION (L'), 9 Place Vendome, Paris
URBAINE (L') 8 Rue Le Peletier, Paris
URBAINE (L') & LA SEINE, 39 Rue le Peletier, Paris

ZURICH, 9, Rue Pillet-Will, Paris

GERMAN.

"AGRIPPINA" u. NIEDERRHEINISCHE VERBUNDETE TRANSPORT-VERSICHERUNGS-GESELLCHAFT RHEING. 6 Coln a. Rh.
ALLG. VERSICHERUNGS VEREIN AUT. VERSICHR Akt. Ges. Unfall & Leben, Stuttgart

ATLAS, DEUTSCHE LEBENSVERSICHERUNG Ges. A. G. f. Unfall & Haftplicht, Versicherung, Ludwigshafen a. Rh.

BERL. AUTOMOBIL VERSICHERUNGS-BURO, Alfr. Weymann, S.W. Schleiermacherstrasse 21 Berlin

DALLEY, Paul, S.W. Zimmerstr. 29 s.a. "Agrippina," Berlin
DEUTSCHE TRANSPORT VERSICHERUNGS-GESELLSCHAFT W. Charlottenstr 29/30 Berlin

ERSTE ELS. LOTHR. Unfall & Haftpflicht-Versichr. Ges. A.G. Strassburgh i. Els.

FEUER VERSICHR A.G. "Rhein & Mosel" Mollerstr 5 Strassburgh i. Els.
FEUERVERSICHR A.G. "Rhein & Mosel" Subdirecktion W. Leipsiger-Platz 3 Berlin
FISCHER, Bruno, Auto Motorboot Luftshiff und Aviatiker Versicherung SW Schoneberger Ufer 12 Berlin
FRANKF. ALLGE. VERSICHERUNG A.G. Taunesanlafe 18 Frankfurt a.M.

KOLNER LLOYD ALLG. VERSICHERUNG Akt. Ges. Rheing 6 Coln a. Rh.
KOLNER LLOYD ALLGEM. VERSICHERUNGS A. g. Aut-Motorboot-Luftschiff & Aviatiker-Versicherung SW Schonberger Ufer 12

MANNHEIMER VERSICHERUNG Ges. Werderplatz, Mannheim
MUNCHNER AUTOMOBIL VERSICHR. Bur. Heinr. Neumann Josefspital 16 Munchen

OBERRHEINISCHE VERSICHERUNGS GESELLSCH. Mannheim
OBERRH. VERSICHR. Ges. in Mannheim Gen. Repras SW. Friedrichstr 237 Berlin

PREUSSISCHE NATIONAL VERSICHR. Ges W. Leipzigerstr 16 Berlin

STUTTGARTER MIT-U. RUCKVERSICHR. Akt. Ges., Uhlandtr. 3 Stuttgart

"ZURICH" ALLG. UNFALL U-HAFTPLICHT-VERSICHERUNGS A.G. Bankstr 7 Mulhausen i. Els.

SWISS.

SCHWEIZ. MOBILIAR-VERSICHERUNGS Ges. Abt. Aut. Versichr. Schwaneng. Bern.
SCHWEIZER MOBILIAR VERSICHR. Ges. Abt. Auto-Versichr. Stockerstr 49 Zurich
SCHWEIZER UNFALL VERSICHR. A.G. Winterthur
"ZURICH" ALLG. UNFALL-U. HAFTPFLICHT VERSICHR. A.G. Zurich

LUBRICANTS.

AUSTRIAN.

A.G. d. WIEN FLORIDSDORFER MINERAL OEL FABR. I., Weihburgg 18 Wien

ERSTE NUSSDORFER OEL-FETTWAREN & HARZ-PRODUKTENFABR. LUDW. PEYREL, XIX/8 Wien

GERSON BOEHN & ROSENTHAL, 20 Donaueschingen-strasse, Vienna XX.

KIND & HERGLOTZ, Aussig a. Elbe

OEL UNION G.Z. Rez. von Oelen u. Oelprap, f. Ind. u. Handel, XXI, Ostmarkg 44, Wien.

REIS, ADALBERT, Oelraffin, X/1 Rotenhofgasse 29 Wien

STADTLAUER OELRAFFIN & CHEMISCHE PRO-DUKTEN FABR. EDW. COOPER, III/2 Bechardgasse 23 Wien

VACUUM OEL COMP. A.G. Auto Abteilung, Almas-Fuzito, Ung.

BELGIAN.

BENZO-BELGE (la), 11 Boulevard du Régent, Brussels

GUELETTE & Cie, Hug. (*Diamond-Running Oil.*)

BRITISH.

ADAMS BRITISH OIL Co., Ltd., Plough Bridge, Deptford, London, S.E.

ANGLO-AMERICAN OIL CO., Ltd., 22 Billiter Street, London, E.C.

ANGLO-BOSPHORUS OIL Co., Ltd., Bristol

BOWRING PETROLEUM Co., Ltd., Finsbury Court, London, E.C.

BRITISH MONOGRAM OIL Co., Ltd., 177 The Vale, Acton, London, W.

BUTTERWORTHS, Ltd., 5 Roscoe Chambers, Liverpool

BRITISH PETROLEUM Co., Ltd., 22 Fenchurch Street, London, E.C.

CARLESS, CAPEL & LEONARD, Hope Chemical Works, Hackney Wick, London, N.E.

COUNTY CHEMICAL Co., Ltd., Chemico Works, Bradford Street, Birmingham

DICK & Co., Ltd., 33 Eastcheap, London, E.C.

ENGLEBERT & Co., 119 Finsbury Pavement, London, E.C.

GRINDLEY & Co., Ltd., Poplar, London, E.

KAYE (J.) & Sons, Ltd., 93 High Holborn, London, W.C.

MONOVO Co., Mono Works, Stewart's Road, London, S.W.

O'BRIEN (H. F.) & Co., Broadheath Oil Works, Manchester

PETROLEUM Co., Ltd. (The British), 22 Fenchurch Street, London, E.C.

PRICE'S Co., Ltd., Belmont Works, Battersea, London, S.W.

ROSE (Sir W. & Co.), 66 Upper Thames Street, London, E.C.

STERN-SONNEBORN (A. G.), Royal London House, Finsbury Square, London, E.C.

VACUUM OIL Co., Ltd., Caxton House, Westminster, London, S.W.

WAKEFIELD (C. C.) & Co., 27 Cannon Street, London, E.C.

WHITE, 47 Curtain Road, London, E.C.

WILCOX & Co., Ltd., 23 Southwark Street, London, S.E.

DANISH.

BEAUVAL (de) Saxlund, 18 Kobmagergade, Copenhagen

MEYER & HENCKEL, 60 Kobmagergade, Copenhagen

FRENCH.

ACHER, 23, Rue Alexandre Pilleaud, Ivry Port (Seine)

ANDREE (A.) Fils (Societe Anonyme), 8 Rue de la Tour-des-Dames, Paris

AMELIN & RENAUD, 37 Rue Jean-Jacques-Rosseau, Paris

AMERICAN OIL Co., 42 Rue Peletier, Paris

BADIN, 3 Rue de la Mare, Paris

BAILLY, 8 Rue de la Michodière, Paris

BANTEGNIE & NEVU, 10 Rue Bateau, Aubervilliers

BARBAT (C.), Charenton

BAUD, 24 Rue Saint-Roch, Paris

BAUDOUIN, 32 Quai Saint-Vincent, Lyon

BEDFORD PETROLEUM Co., 67 Boulevard Hausmann, Paris

BESANCON (E.), 7 Rue de Ermitage, Saint-Denis

BLUT & Co., 86, Avenue de Paris, St. Denis (Seine)

BONIFACE, FRÈRES, Sotteville-L-Rouen, Seine Inferieure

BONNEVILLE, ROUILLY & Cie, 27 Rue du Landy, Saint-Denis

BORREL & Fils, 88 Rue de Vincennes, Bagnolet (Seine)

BOUCHON & BERTRAND, 30 Rue de l'Avenir, Clichy (Seine)

BOUGAULT & Cie, 32 Boulevard Ornano, Paris

BOURGEOIS-OUDRY, 18 Rue de la Paix, Vincennes (Seine)

BOYER & CAVAILLON, 16, Boulevard Francois Ier Le Havre (Seine Inferieure)
Rue du Bon Pasteur, Marseille (Bouches du Rhone)

BUISINE & Cie, 88 *bis*, Rue Francois Ier, Colombes (Seine)

BURCKHARDT, 18 Rue Poliveau, Paris (*Auto-Gazoil*) (*Auto-Moto.*)

CABANNE-NIROUET, 124 Route de Joinville, Champigny-s-Marne (Seine)

CALISCH-ORESTE, 4 Avenue du Cog, Paris

CAMUS, 8 Rue Malher, Paris

CAPET, 61 Rue de la Verrerie, Paris

CATHALIFAUD, 120 Boulevard Magenta, Paris

CAUET, 18 Boulevard Pagel, Saint-Denis

CAYEUX, Place de Marche-aux-Herbes, Compiègne (Oise)

CHAILLY, 15 Rue Catulienne, Saint-Denis

CHATELET, 30 Rue de Fontenay, Nogent-sur-Marne (Seine)

CHAUDIN & Cie, 132 Faubourg, Saint-Denis, Paris

CHEMET, 143 Route de Versailles, Boulogne (Seine)

CHEMIN (A.), 10 Rue Gresset, Amiens (*Lubrifa.*)

CHICHIGNAUD Au CORNILLON, Saint-Denis

CHOUILLOU, 14 Rue Duphot, Paris

CLAUDY, 92 Rue Neuve-des-Charpennes, Lyon

COLMET & Cie, 70 Rue de Rivoli, Paris

COLUMBRIA (Soc. des Prod. & Pub.), 48 Rue de Paris, Saint-Denis

COSTADAU, 13 Rue Vendome, Lyon (*Golden Oil.*)

DANIEL, 4 Rue Villedo, Paris.

DEGREMONT, 21 Rue Godot-de Mauroi Paris (*Lion.*)

DEGUEANT, Avenue Maurice, Villemomble

DELAGE, Quai d'Issy, 37 Issy-les-Moulineaux

DELETTREZ, 7 Rue Gide, Levallois-Perret (*G.D.*)

DELIGNY, 3 Rue de Buisson-Saint, Louis, Paris

DESCROIX (P.) & LESAGE, 18 Rue de Normande Asnières (Seine)

DESSALLE, 39 Rue de Paradis, Paris

DEUTSCH (Les Fils de), 50 Rue de Châteaudun, Paris (*A.D.*) (*Jupiter.*)

DION BOUTON (De), 36 Quai National, Puteaux (Seine)

DOMONT, 36 Boulevard Ornano, Paris

DROUOT 172 Faubourg Saint-Martin, Paris

FAUCHER, 106 Boulevard Sebastopol, Paris

FEIGEL, 38 Rue du Turenne, Paris

FERRANDON, 164 Avenue de Valmy, Paris

FERRON, 89 Boulevard Saint-Denis, Courbevoie (Seine)

FIRBACH, 16 Rue Violet, Paris

FLOQUET, 36 Rue de la Haie-Cog, Paris

FOURNIER, Frères, 12 Rue Castérès, Clichy
FLEURY, 7 Rue du Landy, Saint-Denis (Seine)
FRANCO-RUSSE, (Co.), 10 Rue Thimonier, Paris "NEWOLINE"
FULGUR, 91, Quai d'Asnieres, Asnieres (Seine)

GAGNEPAIN, BONNOT & Cie, 109 Rue Victor-Hugo, Levallois-Perret (Seine)
GALENA OIL Co., Paris
GAMARD & LAPLECHE, 8 Rue de Thorigny, Paris
GARDAIR, 71 Rue de Vaugirard, Paris
GAUBERT, 40 Avenue de la Grande-Armée, Paris
GENERAL INDUSTRIELLE (La), 5 Boulevard Voltaire, Paris
GEORGER (A.), 28, Route de Flandre, Le Bourget (Seine)
GIRARD, 102 Rue du Gazometre, Montreuil (*La Becanine*)
GONNOT, 33 Boulevard de la Chapelle, Paris
GUILLAUD & VALLAT, 36 Chemin, Saint-Matthieu, Lyon
GUILLET et Cie, 12 Rue Perrier, Levallois-Perret
GUYENOT (J.), 1 Rue du Printemps, Paris (*Motoléine.*)

HACHARD, 43 Boulevard, Richard-Lenoir, Paris
HAMELIN, 65 Rue Rivay, Levallois-Perret
HAMELLE, 21 Quai de Valmy, Paris (*Valvoline*).
HARMIGNIES, 105 Rue de Paris, Ivry Port
HERZENBERG, 18 Avenue du Chemin der Fer Colombes (Seine)
HUILES & GRAISSES INDUSTRIELLES 18 Rue Gambetta, Nanterre (Seine)
HUILES-VITESSE (Soc. An. des), 19, Rue des Minimes, Courbevoie (Seine)

INDUSTRIELLE GENERALE (L'), 27 Rue la Bruyère, Paris

LACARRIÉRE & GRAVELIN, 11 Rue de Neuilly, Clichy (*La Preferee.*)
LAGET, 86 Avenue d'Allemagne, Paris
LAMPE, Freres, 32 Rue Saint-Lazarre, Paris
LA SELVE & BOURGEON, Rue Neuve des Charpennes, Lyon (Rhone) (*Auto Oil*)
LEBRASSEUR & Cie, 155 Rue de Paris, Saint-Denis
LEBRASSEUR, 11 Rue de la Vega, Paris
LECLERC (C.), 33 Rue Auger, Pantin (Seine)
LENOIR, 38 Rue de Montreuil, Pantin (Seine)
LENORMAND, 18 Avenue Saint-Germain, Puteaux (Seine)
LEONHARD, 14 Rue Coypel, Paris
L'HERITIER & Cie, 88 Rue de Paris, Saint-Denis
LILLE & BONNIÉRES, 10 Rue des (Seine) Paris
LUBIN, 17 Rue du Lagaat, Ivry-Port, Calais
LUBRICATING Oil Co., Route de Sartrouville, Le Pecq (Seine & Oise)
LYNDALL & Cie, 80 Rue Taitbout, Paris

MACKAY, 2 Cité Trévise, Paris
MAILLET, 9 Rue Alfred Gendre, Abbeville (Somme)
MALICET & BLIN, 103 Avenue de la Republique, Aubervilliers (*Mab.*)
MANCEAU, 60 Rue de Flanders, Pantin
MARECHAL, 75 Avenue du Chemin-de-Fer, Le Vestinet (Seine et-Oise)
MARTIN (V.), 50 Boulevard de Strasbourg, Paris
MARVILLE & Cie, Rueil (Seine et Oise)
MAUPRÉ, 18 Rue de la Chapelle, Paris
MICHEL, 18 Rue Ferragus, Aubervilliers
MORIN, 48 Rue de l'Aqueduc, Paris

NANTERRE, 18 Rue Gambetta, Nice (Seine)
NASSOY & RIBAUD, 87 Rue Charles-Nodier, Pantin (*Colzarine*)
NICKMILDER, 82 Rue Daquerre, Paris
NOBLET, 1 Rue Pastuer, Ivry-Port (Seine)
NORTZ, 29 Boulevard Sébastopol, Paris

OLEO, 30 Rue Perrier, Levallois-Perret (Seine)
OLEONAPHTES (Societé Anoyme), 164 Avenue de Paris, Saint-Denis (Seine)
OLÉONNAPHTES ÉMULSIONNES (Societé Anonyme), 3 Avenue Victor-Hugo, Paris
ORANGE & Cie, 432 Avenue de Paris, Saint-Denis (Seine)

PANHARD-LEVASSOR, 19 Avenue d'Ivry, Paris
PELON, 76 Avenue de la Republique, Paris
PENNSYLVANIA OIL Co., 30 Rue Sainte-Cécile, Marseilles
PETROLES OIL Co., 2 Rue Pongate, Marseilles (*Onctua.*)
PEUGEOT, FRERES, 71 Avenue de la Grande-Armée, Paris Valentigney
PIETRATERRA (A.), 15 Rue Etienne, Bast, Argenteuil (Seine)
POURCHEIROUX, 41 Rue Saint-Ferdinand, Paris
POULET & TAYART, 8 Rue de Madrid, Aubervilliers (Seine)
PRADERIE & Cie, 38 Rue du Quatarze-Juillet, Le-Saint Gervais (*Virginia*)

QUERVEL, 35 Rue du Port, Aubervilliers (*Kervoline*)

RASTIT (H.), 38 Rue Bicolas, Marseilles
RECORD, 27 Quai Gailleton, Lyon (Rhone)
REGNIER, Fils & RODDE, 11 Rue Etienne-Dolet, Paris
RENAUD & TRIPETTE, 37 Rue Jean-Jacques-Rosseau, Paris
RENAULT (V.), 145 Avenue, Parmentier, Paris
REVAUX, 63 Boulevard Thiers, Amiens (Somme)
RICBOURG, 48 *bis*, Rue de Rivoli, Paris
RINCK, FILS, 66 Rue de Rivoli, Paris
ROBERT, 25 Rue Drouot, Paris.
RONDEL, 101 Rue Marceau, Montreuil (Seine)
RONDEL (Ch.), 57 Rue de Saint-Mandé, Montreuil

SAUTET, FRERES, 99 Route d'Orléans, Montrouge (Seine)
SIMONET (L.), 45 Rue Gambetta, Nancy (Mewithe & Moselle)
SIMON-ROCHÉ, 17 bis, Avenue du Mang, Tours (*Auto-Sims*)
SIVAN, 8 Place de l'Evéscné (Rhone), Préjus *Record, Aeroline, Motord*)
STANDARD OIL Works, 69 Rue d'Hauteville, Paris.
STORAGE (B.), 15 Rue de Paris, Nice (Alpes-Maritimes)
SYLVESTER (E.), 19, Quai du Havre, Rouen (Seine-Inferieure) "W.S."

TESSE, 15 Rue de Surène, Paris
TORRE & Cie, 112 bis, Rue de Paris, Vincennes (Seine)
TOURNEL, 18 Avenue d'Italie, Paris.
TRABET (L.), 1 Rue Amelot, Paris (*Trabcoline*)

VACUUM OIL Co., Ltd., 34 Rue de Louvre, Paris
VILLENEUVE (A.), 1 Boulevard Saint-Jacques, Paris "VALVOLINE," 21, Boulevard Jules Ferry, Paris

WALLACH & Cie, 60 Avenue de la Republique, Aubervilliers (Seine)
WALLET, 12 Rue Rennequin, Paris
WISNER (G.), 29 Rue de Neuilly, Clichy (Seine)

ZEMMER, 91 Rue Petit, Paris

GERMAN.

APEL, J. N. Oel und Fettfabrik, Blumenstr 7 Braunschweig
BEEG & ZOELLER, Automobile Oele, Heidelhoffplatz 7 Nurnberg
CHEM. FABRIK GEORGE W. MEYER, O. 17, Muhlenstr 70/71, Berlin
DERNER OELWERKE CRAMER & DAHLMANN, Dortmand
DEPAUW & Cie, 6 Rue de la Linère, Brussels
DEUTSCHE ACHESON OILDAG Co. G.m.b.H. "Oildag & Aguadag" Schmierdittel, C 2 Burchaus Borse, Berlin
DEUTSCHE ŒLVERKE, 1 Prinz-Louis Ferdinandstrasse, Berlin
DEUTSCHE OELWERKE, G.m.b. H. Vacuum Oele Marke "Vacuum," u. konsisten-te Fette N. 24 Friedrichstr 105
DEUTSCHE VACUUM OEL A.-G. Automobil Abt. "Gargoile" Spez Oele & Fette, Semperhaus B III, Hamburg
FINKE, Emil, Oelfabrik, Bremen
HEINZ, P. P. Spez. Auto Oele, Frankfurt a. M., Sachsenhausen
HELD, Carl Christian, Maschinenolfabr. Rotebuhstr 149 Stuttgart

INDUSTRIE-FETTWAREN FABRIK G.m.b.H. vorm. Carl Sachs, Zabrze O.-S.

KULLAK, F. c. Komm, Ges. N. 4 Gartenstr 18 Berlin

MOBIUS & SOHN H., Motoren Oele "Autol," Hannover, Wulfel

OELFABR. H. BAUER & Co., Eichwaldstr 8/10 Frankfurt a.M.

OELWERK STERN SONNEBURN A. G. Werft. Str. 9 Hamburg, Kl. Grasbrock

OELWERK FRIETZ WIHL, Honinger Weg 96, Coln a. Rh. Zollstock

NEUSSER OEL RAFFIN. Jos. Alfons van Endert, Neuss A. Rh.

PERL OEL WERKE W. Doernkamp, Rheinbahnstr. 5, Wiesbaden

PETROL. RAFFIN. vorm. Aug. Korff. "Velozol"-Oel f. Aut. Boots & Luftsch. Mot., Stephanikirchenweide 20 Bremen

PETROLEUM RAFFINERIE, Breme *(Veloscol)*

PINNER, L.N. 20 Exerzierstr. 1', Berlin

PROESSDORF, Jacob Oelfabrik, Altenburg a.

ROTHSCHILD S, Oelfabrik. Holzmanstr, Frankfurt a.M.

SUDDEUTSCHE OELWERKE J., Grotzinger & Co., Freiburg i.B.

SPILCKE, 94 Chaussestrasse, Berlin

STERN-SONNEBORN (A. G.), 21 Ritterstrasse, Berlin S. 42

SÜDDEUTSCHE OELWERKE, Fribourg-en-Brisgau Freiburg i. B.

VALVOLINE COMP. AUTOMOBIL Abt. G.m.b.H., Holzbrucke 7/11 Hamburg

VALVOLINE OIL Co., 7 Holzbrücke, Hambourg

VOGT & Cie, Görlitz *(Vostol)*

VOGT & Co. Bahnhofstr 6 Gorlitz

ITALIAN.

ARNOLDI & Cie, 37 Via Paolo do Cannobio, Milan

CECCARELLI, TEDESCHI & Cie, Corso XXII., Marso, 34, Milan *(Teuff)*

CORLIE RE, 8 Via Santa-Azata, Boulogne

FOLTZER (E.), Rivarolo-Lugure, Genes

KOCH (O.), 50 Via Abbadesse, Milan

MIRAGOLI & PETSATORI, 67 Foro Bonaparte, Milan

OLEUM, Galleria Nazionala, Turin

PETROLIO, 76 Piazza Cinque Lampade, Genes

REINACH & Cie, 90 Via Lario, Milan *(Oleoblitz)*

VOLPATO & Cie, 11 Via Santa-Maria-Fulcornia, Milan

ROUMANIAN.

TRAJON, Bucharest, Roumania

RUSSIAN.

CHABANIAN (R.), Batoum-Bakou

KAISER (R.), Baku

MALLARD, Caucase, Batoum

NOBEL, Frercs, St. Petersburg

PITOEFF & Cie, Tiflis

SCHIBAEFF & Cie, Bakau

TER AKOPOFF, 3 Place Isaac, St. Petersburg

SPANISH.

FONTAGUD, 6 Puentes, Madrid

OLEON Co., 13 Asalto, Saragossa

USERA (Dc), 47 Legdnitos, Madrid

VACUUM OIL Co., 598 Cortes, Barcelona

SWISS.

DIETRICH & Co., Oele U. Fette, Altstetten b. Zurich

DIETRICH & Cie, Rapidol Oel, Zurich

GRISARD (G.), 302 Route de Greuzach, Bâle

HALLER, 8 Splugenstrasse, Zurich

HEUMANN (A.) & Cie, Winterthur

HUILES MINERALES, Route de Frontenex, Geneva

KUHN & Co., Jules, Zurich

LAMBERCIER (J.) & Cie, Geneva

LUMINA (S. A.), Geneva-Vollandes

MOBIUS & FILS H., Autol Oele, Basel.

MOEBIUS (H.) & Fils, Bâle

OMNIA (Maison), Chêne-Bourg, Geneva

SCHMID, 133 Murtenstrasse, Berne

SOCIETIE ANONYME, Lumina, Genf-Vollandes

TERPOL A. G. Mineralole, Venedigstr. 2 Zurich

U.S.A.

DIXON (J.) CRUCIBLE Co., Jersey-City, New York, *(Graphite)*

KEYSTONE LUBRICATING Co., Philadelphia

WHITE & BAGLEY Co., Worcester *(Oilzum)*

MAGNETOS.

AUSTRIAN.

DENES & DRIEDMAN, 11 Mitterbergasse, Vienna XVIII.

ERBEN (S.) & ARNOLD FRIEDMANN, 14 Stubenring, Vienna I.

BELGIAN.

BOSCH MAGNETOS, 121 Rue de l'Instruction, Brussels

PERNSTEIN (Ateliers), 8 Rue Laporte, Liege-Nord

BRITISH.

BOSCH MAGNETOS { 40-42 Newman Street, London, W.C. 28 Store Street, Tottenham Court Road, London, W.C.

EISEMANN MAGNETO Co., 43 Berners Street, London, W.

FULLER (J. C.) & Son, Woodland Works, Wick Lane, Bow, London, E.

MEA MAGNETO Co., Gresse Buildings, Stephen Street, Tottenham Court Road, London, W.

NILMELIOR (Société d'Electricité), 36-37 Alfred Place, Tottenham Court Road, London, W.C.

RICHES (G. T.) & Co., 19 Store Street, Tottenham Court Road, London, W.C.

SIMMS MAGNETO Co., Ltd., Welbeck Works, Kilburn, London, N.W.

VAN RADEN & Co., Ltd., Great Heath, Coventry.

DUTCH.

BOSCH MAGNETOS, Willem Van Rijm, Keizergracht 181, Amsterdam

FRENCH.

BARDON (L.), 60 Boulevard National, Clichy (Seine)

BAUDOT ET PAZ, 22 Avenue de la Grande-Armée, Paris *(Simms.)*

BOIN, 33 Rue du Four, Paris

BOSCH (Société des Magnétos Bosch) { 298 Avenue de Saxe, Lyon (Rhone) 17 Rue Theophile-Gautier, Paris

BREGUET (Maison), 19 Rue Didot, Paris

DEBEAUVE, 68 Rue de Sevres, Paris *(Vestale)*

EISEMANN & Co., Lavalette & Cie., 175 Avenue le Choisy, Paris

EXTRA. *(See* Giffard.)

GIANOLI, 26 Boulevard Magenta, Paris

GIBAUD, 309 Rue de Faubourg, Saint-Antoine, Paris

GIFFARD, 283 Rue des Pyrénées, Paris *(L'Extra)*

GIRARDEAU (A.), 7 Rue Scribe, Paris

GUENET, 5 Rue Montmorency, Paris

GUILLOU, 41 Rue de Bagneux, Montrouge (Seine)

HENRIQUE, 54 Quai de Courbevois, Courbevois

HERDTLE & BRUNEAU, 93 Rue Pelleport, Paris

HOMMEU (H.), 28 Rue Sainte Marthe, Paris

HYDRA, 39 Avenue du Roule, Neuilly-sur-Seine (Seine)

ILIYNE-Berline, 8 Rue des Dunes, Paris

INVICTA, 5 Rue Deves, Neuilly-sur-Seine (Seine)

JUSTON & Cie, 62 Rue du Chemin-Vert, Paris

KELLER-DORIAN, 3 Chemin Rampon, Lyon (Rhone)

LAVALETTE EISEMANN, 175 Avenue de Choisy, Paris *(Eisemann)*

MEA, 7, Rue Delaizement, Neuilly-sur-Seine (Seine)

MEA MAGNETO, Feld-Dengen, 157 av. Malakoff, Paris

MONTBARBON (Société Anonyme), 47 bis, Rue de Villiers, Neuilly-sur-Seine

MULLER, 204, Rue de Grenelle, Paris "NORIS"

NIEUPORT, 9 Rue Edouard Nieuport, Suresnes

NILMELIOR, 49/51 Rue Lacordaire, Paris

RIEDE, 10 *bis*, Rue Descombes, Paris "U.H."

SIMMS MAGNETOS, 12 Rue de Courcelles, Levallois-Perret (Seine)

STUART & STICHTER, 18 Avenue des Ternes, Paris *(Splitdorf)*

UNTERBERG & HELME, 166 Rue Lafayette, Paris *(U.H.)*

GERMAN.

BERGMANN'S INDUSTRIEWERKE, Gaggneau *(G.m.b.H.)*

BOSCH MAGNETOS, 11 Hopperlaustrasse, Stuggart

EISEMANN & Co., 61 Rosenbergstrasse, Stuttgart

FIELDER (W.), Eisenach *(Ruthardt)*

HAENDLER (A.), 82 Heidestrasse, Berlin

MEA *(G.m.b.H.)*, Stuttgart

RAPID ACCUMULATOREN & MOTOREN WERKE, 149 Hauptstrasse, Schoneberg-Berlin

RUTHARDT & Co., 77 Olachstrasse, Stuttgart

SCHOELLER (A.), Frankfort

TAUNUS ZUNDERFABRIK *(G.m.b.H.)*, Frankfort

UNTERBERG & HELME, Durlach, Baden

WECKERLEIN & STOCKER, 7 Wodanstrasse, Nuremberg *(Moris)*

ITALIAN.

BOSCH MAGNETOS, 18 Via San Vittore, Milan

EISEMANN & Co., Ditta Secondo Pratti, 32 Carlo-Alberto, Milan

LUCINI (Enrico), 3 Via Petrarca, Milan

SWEDISH.

BOSCH MAGNETOS, Fritz Egnall, Norra Bantorget 29, Stockholm

SWISS.

KESSERLING (F.) & Cie, Schaffhouse

KOMET, 98 Brunaustrasse, Zurich

U.S.A.

BOSCH MAGNETOS :—
160 West St., 58th Street, New York.
223 & 225 West 46th Street, New York.
1253 Michigan Avenue, Chicago
357 Van Ness Avenue, San Francisco

DAYTON ELECTRIC MANUFACTURING Co., 98 St. Clair Street, Dayton, Ohio

DOW MANUFACTURING Co., Braintree

FAWN RIVER MFTG. Co., Constantine, M.

FISCH (Geo. L.), 1451 Michigan Avenue, Chicago

HEINZE ELECTRIC Co., Lowelle, Mass.

HOLTZER, CABOT ELECTRIC Co., Boston *(H.C.)*

K.W. IGNITION Co., 30 Power Avenue, Cleveland, Ohio

MEA MAGNETOS, Marburg Bros., Inc., U.S. Rubber Buildings, New York. Also Detroit and Chicago.

MOTSINGER DEVICE MFTG. Co., Pendleton, Ind.

PITTSFIELD SPARK OIL Co., Dayton

REMY ELECTRIC Co., Anderson, Ind.

SPLITDORF Co { 261-265 Walton Avenue, New York. 138th Street, New York.

BELGIUM.

WANSON (Maurice), 10 Rue Jean Stas, Brussels

BRITISH.

AEROPLANE SUPPLY Co., Ltd., 111 Piccadilly, London, W.

BRITISH AMERICAN Co., 300-33 Widdrington Road, Coventry
BRITANNIA ENGINEERING Co. (1910), Ltd., Britannia Works, Colchester
BRITISH EMALLITE Co., Ltd., 30 Regent Street, London, S.W.
BRITISH INSULATED & HELSBY CABLES, Ltd., Warrington
BRITISH LOW ACCESSORIES Co., Ltd., 15 Great St. Helen's, London, E.C.
BONN (J.) & Co., Ltd., 97 New Oxford Street, London, W.C.
BOWDEN PATENTS, Ltd., Baldwin Gardens, London, W.C.
BROOKS (J.B.) & Co., Ltd., Criterion Works, Birmingham.
BROWN (Bros.), Ltd., Birmingham
BRAMPTON (Bros.), Ltd., Birmingham
BURBERRYS, The Haymarket, London, S.W. (*Aviation Garments*)

CAMMELL, LAIRD & Co., Ltd., Cyclops Steel Works, Sheffield.
CENTRAL NOVELTY Co., 99 Snow Hill, Birmingham
CHATER, LEA, Ltd., 114 Golden Lane, London, E.C.
CLARK (T. W. R.) & Co., Crown Works, High Street, Kingston-on-Thames
COAN (Robt. W., 219 Goswell Road, London, E.C. (*Aluminium Castings.*)
COWEY ENGINEERING Co., Ltd., 1 Albemarle Street, London, W.
CRAMPTON & Co., 73 Queen Victoria Street, London, E.C.
CROSLEY, LOCKWOOD & SON, 7 Stationer's Hall Court, London, E.C. (*Publishers*)

DENNIS Co., Ltd., Guildford.
DOBBIE McINNES, Ltd., Glasgow, N.B.
DRESSER & GARLE, Regent House, Regent Street, London, W.
DRUMMOND BROS., Ltd., Ryde's Hill, Guildford

EISEMANN MAGNETO Co., 43 Berners Street, London, W.
ESSEX ACCUMULATOR Co., 499 Grove Green Road, Leytonstone, London, N.E.
EVANS (Geo.) & Co., 94 Albany Street, Regent's Park, London, N.W.

MISCELLANEOUS ACCESSORIES.

FLATHER (W. T.), Ltd., Standard Steel Works, Sheffield
FRASER BEGG & Co., Ilford.
FONTEYN & Sons, 76 Newman Street, London, W.
FOULIS (Wilfred), Ltd., Sunbury News, Belford Road, Edinburgh

GENERAL AVIATION CONTRACTORS, Ltd., 30 Regent Street, London, S.W.
GEOGRAPHIA DESIGNING & PUBLISHING Co., Ltd., 33 Strand, London, E.C. (*Maps, etc.*)

HAIM (N. S.), 69 Mark Lane, London, E.C.
HANDLEY PAGE, Ltd., 72 Victoria Street, London, S.W.
HASLER TELEGRAPH WORKS, 26 Victoria Street, London, S.W. (*Indicators*)
HILL (ROWLAND) & Sons, Ltd., Albion Foundry, Coventry
HOBSON (H. H.), Ltd., 29 Vauxhall Bridge Road, London, S.W.
HORA (E. & H.), Ltd., 36-38, Peckham Road, London, S.E.
HOYT METAL Co. OF CT. BRITAIN, Ltd., 26 Billiter Street, London, E.C.
HUNTSMAN (B.), Attercliffe, Sheffield
HURLIN (J.) & Son, 191 Cambridge Road, London, E.

JENNINGS, GUILDING & Co., 60 Southgate Street, Gloucester
JONES, Invicta Works, Crayford, Kent.
JONES BROS., Ltd., 12, York Street, Manchester (*Fabrics, etc.*)

KALKER (E.) & Co., Much Park Street, Coventry
KEMPSHALL TYRE Co., 1 Trafalgar Buildings, London, W.C.
KIRKBY BANKS SCREW Co., Ltd., Meadow Lane, Leeds

LAMPLOUGH & Sons, Ltd., Albion Works, Cumberland Park, London, N.W.
LUCAS, 116 Dale Street, Liverpool.

MALLINSON (Wm.) & Sons, 130-138 Hackney Road, London, N.E.
MARSH (Bros.) & Co., Ltd., Ponds Steel Works, Sheffield
MARKT & Co., 6 City Road, London, E.C.
MEA MAGNETO Co., Grease Buildings, Stephen Street, Tottenham Court Road, London, W.
MELHUISH (R.), Ltd., 50 Fetter Lane, London, E.C.
MELLIN (F.) & Co., Salisbury Road, Kilburn, London, N.W.
M. P. G. Co., 98 Tollington Park, London, N.
MOTOR ACCESSORIES Co., 85 Great Marlborough Street, London, W.
MOTOR AVIATION Co., Ltd., 628, Martin's Lane, London, W.C.

NOBLES & HOARE, Ltd., Cornwall Road, Stamford Street, London, S.E.
NORTH BRITISH RUBBER Co., Ltd., Castle Mills, Edinburgh

OWEN (Joseph) & Sons, Ltd., 199a Borough High Street, London, S.E. (*Aeroplane Woods*)

PALMER (L. N.), 9a Trevelyan Road, Tooting, London, S.W.
PALMER TYRE Co., Ltd., Shaftesbury Avenue, London, W.C.
PHILIPPS, Fentum Aeroplane Works, Guildford
PICCOTT Bros. & Co., Ltd., 220, 222, 224, Bishopsgate, London, E.C.
POLDI STEEL Works, Napier Street, Sheffield

RANDALL (J. H.) & Co., Green Street Works, Paddington Green, London, W.
READ (H. N.), Falmouth, Cornwall
REASON MNFTG. Co., Ltd., Lewes Road, Brighton
RENOLD (Hans), Ltd., Progress Works, Brook Street, Manchester
ROE (A.V.), Gt. Ancoats Street, Manchester
ROGERS Bros., 33 Aldermanbury, London, E.C. (*Fabrics, etc.*)
ROLLETT (H.) & Co., "Avia" Works, Coldbath Square Rosebery Avenue, London, E.C.
ROSS, COURTNEY & Co., Ltd., Ashbrook Road, Upper Holloway, London, N.
ROTHERHAM & SONS, Coventry
RUBERY, OWEN & Co., Darlaston, Staffs.

SCHAFFER & BUDENBERG, Whitworth Street, Manchester
SEEBOHM & DUCKSTAHL, Ltd., Dannemora Steel Works, Sheffield
SHORT (Bros.), Eastchurch, Sheppey
SMITH (F.) & Co., Ltd., Wire Manufacturers, Caledonia Works, Halifax
SNOWDEN & Sons, 427 Norwood Road, London, S.E.
SPEAR & JACKSON, Ltd., Actna Works, Sheffield
SPIRAL TUBE & COMPONENTS Co., Caledonian Street, King's Cross, London, N.
SPENCER MOULTON (G.) & Co., Ltd., 77-9 Cannon Street, London, E.C.
STEWART & CLARKE MFTG. Co., 11 Denmark Street, Charing Cross, London, W.

THORN & HODDLE ACETYLENE Co., Ltd., 151 Victoria Street, London, S.W.
TIMPERLEY (Chas. B.), 86b, Snow Hill, Birmingham
TORMO MFTG. Co., 67 Bunhill Row, London, E.C.

UNITED MOTOR INDUSTRIES, Ltd., 45-6 Poland Street, London, W.
UNIVERSAL AVIATION Co., 166 Piccadilly, London, W.

VAN DE RADEN & Co., Ltd., Great Heath, Coventry
VANDERVELL (C. A.) & Co., Warple Way, Acton Vale, London, W.
VENESTA, Ltd., 28 Eastcheap, London, E.C.

WARWICK WRIGHT, Ltd., 110, High Street, Manchester Square, London, W.
WEBSTER & BENNETT, Ltd., Atlas Works, Coventry
WEST LONDON SCIENTIFIC APPARATUS Co., Ltd., Premier Place, High Street, Putney, London, W.
WHITELEY EXERCISER Ltd., 35-37 Southwark Bridge Road, London, S.E.
WHITEMANN & MOSS, 8 Moor Street, Cambridge Circus, London, W.C.

FRENCH.

ACIERIES DE GERMIGNY, 168, Quai de Jemmapes, Paris
AERA, 16 Avenue de la Grand Armee, Paris
ALLIAGES D'ALUMINIUM, 41 Avenue de la Republique, Courbevoie (Seine)
ALUMINIUM PUR, 89 Rue de la Roquette, Paris
ARIBEL, 28 Rue de Rocher, Paris
AURICOSTE, 10, Rue de la Boetie, Paris
AUTOLOC, 16 Rue Duret, Paris

BARDOU, CLERGET & Cie, 12 Boulevard Sebastopol, Paris
BINET, 6 Rue de Jarente, Paris
BLONDEL LA ROUGERY, 7 Rue Saint-Lazare, Paris
BLOT-GARNIER & CHEVALIER, 9 Rue Beudant, Paris
BESSONEAU, 29, Rue du Louvre, Paris
BORDE (J.), 89 Boulevard, Haussmann, Paris
BOREL et Cie, 11 Chemin de Pré-Gaudry, Paris (Lyon) (Rhone)
BRIANNE, 10 Rue Alibert, Paris

CACATRE, 35 Boulevard Saint-Jacques, Paris
CAMPBELL, 7 Rue Saint-Lazare
CARPENTIER (J.), 20 Rue Delamore, Paris
CENTRAL AERO, 89, Avenue des Ternes, Paris
CHAPMAN (H.), Rue Laffitte, Paris
CHAUVIN & ARNOUX, 188 Rue Championnet, Paris
CITROEN, 292 Rue du Faubourg, Saint Denis, Paris
COMIOT, 204 Boulevard Pereire, Paris
COMPTOIR GENERALE DE MECANIQUE DE PRECISION, 119 Rue Saint Maur, Paris
CONTET, 12 Rue Lacuee, Paris

DOUTRE, 58 Rue Caumont, Paris
DUCOMET, 11 Rue d'Abbeville, Paris

EADIE, 76 Boulevard Gouvion Saint-Cyr, Paris

GALLIA (La.), 34 Quai de Suresnes, Suresnes (Seine)
GAUDET (A.), 7 Avenue de Montreuille Fontenay-sous-Bois, (Seine)
GIRAUD (AINÉ), 49 Rue Greffulhe, Levallois-Perret (Seine)
GLAENZER, 35 Boulevard de Strasbourg, Paris
GODARD (Louis), 170 Rue Legendre, Paris
GOMES (A. C.) & Cie, 63 Boulevard Haussmann, Paris
GRADWOHL, 5 Rue de Montmorency, Paris
GROSSIORD (A.), Saint-Maurice, Seine

HANNOYER (J.), 69 Avenue Parmentier, Paris
HUE (E.), 63 Rue des Archives, Paris
HEMZ, 27 Rue Cave, Levallois (Seine)
HUET, 114 Rue du Temple, Paris

JACQUOT (Rapide lime) 60 Rue Regnault, Paris
JEANPIERRE, 14 Avenue de la Republique, Paris
JOLY, 3 Rue des Acacias, Paris

LADIS LEWKOWICZ, Ernanville (Loiret)
LEFEBVRE, 76 Avenue de la Republique, Paris
LEJEUNE, Impasse du Mont-Joly, 93 Rue d'Angouleme, Paris
LESCART, 57 Rue Servan, Paris
LETORD, 16 Rue Paira (Meudon) (Seine-et-Oise)
LEROY, 7 Boulevard de la Madeleine, Paris
LIGERON, 27 Boulevard Bonne-Nouvelle, Paris
LEVESQUES, Rue des Haudriettes, Paris
LIMKEN, 24 Rue Caumartin, Paris
LOTTE, 31 Avenue Daumesnil, Paris
LUNKEN VALVE Co., 24 Boulevard Voltaire, Paris
MALICET & BLIN, 103 Avenue de la Republique, Paris
MAUVE, 15 Rue des Acacias, Paris
MAXANT, 38 Rue Belgrand, Paris
MAZELLIER ET CARPENTIER, 20 Rue Delambre, Paris
MICHELIN, 105 Boulevard Pereire, Paris
MORIN, 11 Rue Dulong, Paris

PARENNE (J.), 203 Rue Lafayette, Paris
PELLIN, 5 Avenue d'Orleans, Paris
PELON, 76 Avenue de la Republique, Paris
PELTRET & LAPAGE, 4 Rue des Rigoles, Paris
PERE (J.), 46 Boulevard Magenta, Paris
PEUGEOT, 2 *bis*, Rue Berenger, Paris
PIAT (Les Fils de A.) 85 Rue Saint-Maur, Paris
POIRELLE, 4 Place Thorigny, Paris
PRINI, 23 Rue Servan, Paris
PROTAIS, 12 Rue Montbrun, Paris

RADIQUET & MASSIOT, 5 Boulevard des Filles du Calvaire, Paris
REVOLTE, 205 Boulevard de la Gare, Paris
RICHARD (J.) { 15 Rue Melingue, Paris / 10 Rue Paley, Paris
ROEBLING'S (J. A.) & Sons Co., Trenton, New Jersey
ROSENCART & Co., 9 Avenue de Saint-Mande, Paris
ROULEMENTS à BILLES, 44 Rue Franklin, Ivry-sur-Seine
ROULEMENTS à BILLES, 34 Rue de Teevse, Paris

S.A.F. 9 Rue Emilio Castelar, Paris
SCHAEFFER & BRIDENBERG, 105 Boulevard Richard-Lenoir, Paris
SCHILDGE, 18 Rue Sainte Croix de la Bretonnerie, Paris
SEEBOHM & DIECKSTAHL, 4 Rue Sainte-Anne, Paris
SIMPLEX, 43 Rue Lafayette, Paris
SOCIETE GENERALE D'APPAREILS DE CONTROLE, 105 Rue de la Convention, Paris
TUDOR, 81 Rue Saint-Lazare, Paris
VALDENAIRE (H.), ADENET & Cie, 21, rue des Jeuneurs, Paris (*Fabrics*).
ZIVY & Co., 62 *bis*, Rue Demours, Paris

GERMAN.

BAMBERG (Carl), Berlin-Friedenau
BASSE & SELVE, Altena
BUNGE (B.), Oranienstrasse, 29 Berlin, So. 26
DEUTCHENWAFFEN-V-MUNITIONSFABRIKEN, Dorotheenstrasse 43-41, Berlin N.W. 41
EISEMAN MAGNETO Co., 61 Rosenbergstrasse, Nuremberg
FUESS (R.), Steglitz
HACKENSCHMIDT (Ch.), 7 Kramergasse, Strasbourg
MEA MAGNETO, S. Union Werke G.m.b.H. Feurbach-Stuttgart
SPINDLER & HOYER, Goettingue

U.S.A.

BRETZ (J. S.), & Co., Times Buildings, Byrant
BROWN & Co., 1079 Clinton St., Syracuse, New York
CALIFORNIA AERO MFTG. & SUPPLY Co., 441-3 Golden Gate Avenue, San Francisco
CHURCH AEROPLANE Co., Brooklyn, New York
DELTOUR (J.), Inc., 496th Avenue, New York
FRASSE (Peter A.) & Co., 408 Commerce Street, Philadelphia
PEDERSEN MANUFACTURING Co., 636-644 First Avenue, New York
PENNSYLVANIA RUBBER Co., Jeannette, Pa.
RUBEL (R. O.), Louisville, Ky.
RUDOLPH (W. F.), Broad Street, Pa.
SCOTT, Bros., Cadiz, Ohio
STUPAR, 9626 Erie Avenue, Chicago
WEAVER-EBLING AUTOMOBILE Co., 2230 Broadway 79th Street, New York
WITTEMANN (C. & A.), 17-19 Ocean Terrace, Staten, Ist, New York
WILLIS (E. J.) & Co., 85 Chambers Street, New York
WILSON & SILSBY, Yacht Sailmakers, Rowe's Wharf, Boston, Mass.

PACKERS AND SHIPPERS.

BRITISH.

AEROPLANE SUPPLY Co.,Ltd.,111 Piccadilly, London,W.

CARBURINE. (See Gas Lighting Improvement Co.)

DRESSER & CARLE, Regent House, Regent Street, London, W.

MOUNT (J. C.) & Co., 101, Grosvenor Road, London, S.W.

FRENCH.

AMERICAN EXPRESS Co., 17 Rue Scribe, Paris

ARMAND, 17 Rue Brunel, Paris

AUTO-TRACTION, 6 Boulevard Jourdan, Marseille

BOULOGNE-GARAGE, 11 Boulevard Daunou, Boulogne-sur-Mer (Pas-de-Calais)

BRIDEL & Co., 18 Rue Saint-Augustin, Paris

BRAVARD, 40 Rue de l'Arbre-Sec Lyon (Rhone)

CHAVERIE, Boulevard Victor-Hugo, Saint-Jean-de-Luz (B. Pyr.)

COMPAGNIE MONDIALE DE TRANSPORTS, 25 Rue d'Alsace, Paris

ERNAULT & Co., 77 Rue du Grand-Chemin, Roubaix (Nord)

FLORNOY, 89 Avenue des Ternes, Paris

FREVET, 23 Quai d'Orleans, Le Havre

GERFAUD 7, Cité Riverin, Paris

GERSFACH, 34 Rue du Maroc, Paris

GONDRAND FRERES, 26 Rue de la Douane, Paris

LANGSTAFF, THREUBERG & POLLACK, 12 Rue d'Enghien, Paris

LUYLIER, Chateauneuf-les-Bains (Puy-de-Dome)

MESSAGERIES AUTOMOBILES (Compagnie des) Rue Thiers, Deauville (Calvados)

MESSAGERIES AUTOMOBILES DU CHABLAIS (Compagnie des), 3 Boulevard des Vallee, Thonon-les-Bains (Haute Savoie)

PAYSSE & Cie, 22 Rue Amperé, Paris

PITT & SCOTT, 47 Rue Cambon, Paris

ROHMER, 14 Rue d'Antin, Paris

SCHENKER & Co., 8 Rue Saint-Quentin, Paris

SCHOOR, 4 Rue Taylor, Paris

TRANSPORTS TERRESTRES & MARITIMES (Cie Gle des) 14 Boulevard Carnot, Lille

TRANSPORTS AUTOMOBILES DU RHONE (Societe des), 245 Rue Garibaldi, Lyon

TRANSPORTS INTERNATIONAUX (Cie des) 84 Rue d'Hauteville, Paris

TRANSPORTS AUTOMOBILES & AUTO-GARAGE, 74 Boulevard Henri-Martin Saint Quentin (Aisne)

THEODORE, 191 Avenue de Neuilly, Neuilly-sur-Seine (Seine)

THIEROELIN aine & BOISSEE, 40 Rue Laugier, Paris

VADAM (Veuve) Maiche (Doubs)

VILLIEN, 12 Rue Drouot, Paris

WALBANN & CO., 7 Rue De Talleyrand, Reims (Marne) 32 Rue de Tanger, Paris

WINKERT & Co., 38 Boulevard Magenta, Paris

GERMANY.

BECKER, Heinrich, Bremen

BECKER & HESSE vorm. Luder & Fischer, Dresden

BERTHAND OTTO G. Bubersceischer Transport, Berlin C 2

BESTMANN C. W., Neufahrwasser

FEIN J. S., Nurnberg

HECKEMANN JOH, Bremen

HECKEMANN JOH, Hamburg

INNOCENTE MANGILI G.m.b.H., Nurnberg

KREBSTER HANS INTERN. TRANSPORT, Aachen

NEUKIRCH LUIS, Bremen

NIEMANN & Co., Jos, Kolm

PRIOR, Carl, Hamburg

PRIOR, Carl, Bremen

VAIRON & Co., Hamburg

ITALIAN.

AMBROSSETTI (G.), 32 Via Nizza, Turin

U.S.A.

BRINE (B.S.), Transportation Co.

PATENT AGENTS (Aerial Specialists).

BELGIAN.

HAMEL (J.), Liege

WUNDERLICH & Cie., Brussels.

BRITISH.

BREWER & SONS, 35 Chancery Lane, London, W.C.

CHATWIN, HERSCHELL & Co., 253 Grays Inn Road, London, W.C.

EDWARDS (ARTHUR) & Co., Chancery Lane Station Chambers, Holborn, London, W.C.

MARKHAM & FRANCE, Dudley House, Southampton

ROGERS (F. M.) & Co.,21 Finsbury Pavement, London, E.C.

ROOTS (J. D.) & Co., Thanet House, Temple Bar, London, E.C.

STANLEY POPPLEWELL & Co., 38 Chancery Lane, London, W.C.

THOMPSON (W. P.) & Co., 285 High Holborn, London, W.C., and 6 Lord Street, Liverpool

WITHERS (J.S.) & SPOONER, 323 High Holborn, London, W.C.

FRENCH.

ARMENGAUD Jeune, 23 Boulevard de Strasbrough, Paris

BLETRY Aine, 2 Boulevard de Strasbourg, Paris

BRANDON FRERES, 59 Rue de Provence, Paris

CHASSEVENT, 11 Boulevard Magenta, Paris

DUPONT & ELLUIN, 42 Boulevard Bonne-Nouvelle, Paris

GASALONCA, 15 Rue des Halles, Paris

JOUVE, Ingenieur Marseille (Bouches du Rhone)

MESTRAL & HARLE, 21 Rue La Rochefoucauld, Paris

PICARD, 97 Rue St. Lazare, Paris

PROTTE, 88 Boulevard des Strasbourgh, Paris

WEISMANN & MARK, 84 Rue d'Amsterdam, Paris

WOLF & MEIGNAN, 24 Boulevard Saint-Denis, Paris

GERMAN.

ANSBERT VERREITER, Berlin W. 57

BEZUGSQUELLEN-AUSKUNFTEI, Berlin

BUES THEODOR, Ingenieur Bielefeld, Reichsbankstr 1

ERSTE BERLINER PATANTVERWERTUNGS GESELLSCHAFT I.A., Miller & Co., W. Potsdamerstr. 25 Berlin

KLEYER, Varl, Patentanwalt. Kriegstr. 77 Karlsruhe i. Bad

KUSTER JUL. INGENIEUR & DR. HOLKEN, S.W. Konniggratzerstr 82 Berlin

REICHAU & SCHILLING Patentburg W. Kronenstr W. Berlin

VORREITER, Ansbert, Ingenieur Berlin W, Bulow 73

ITALIAN.

BARZANO & ZANARDO, via Bagutta 24, Milan

SPANISH.

BOLIBAR (G), Barcelona.

SWISS.

ROTH & Co., Ingenieur Patenburo, Zurich I., Limmat-quai 94

VOLZ-FUCHS, S. Patentairo, Seefeld Str. 17 Zurich

U. S. A.

EVANS (Victor J.) & Co., 724-726, Ninth St. N.W. Washington, D.C.

OWEN (Richard B.), Dept. 5, Owen Building, Washington,

PARKER (C. L.), 30 McGill Building, Washington, D.C. [D.C.

AUSTRIAN-HUNGARIAN.

AKT.-GES. der WOEN FLORIDDORFER MINERAL-OLFABRIK I., Weihburg 19 Wien
GERSON BOEHM ROSENTHALL, XX/2, Donauschiffahrtstrasse 20 Wien
GANSERNDORFER BENZINERZEUGUNG REICH, BRULL & SCHWARZ, IX, Maximilian-Platz 14 Wien
KONIG & Co., Gustav Benzinfabr. Brietenseergasse, Kagran b. Wien
LEDERER (M.) (*Galizche Karpathen Petroleum A.G.*), Galicia
MAGYAR PETROLEUM IPAR, Akt.-Ges. Budapest
NAPHTE UNGARISCHE, 33 Vaczi-Korut, Budapest, Hungary
RUSSIAN-AMERICAN OIL Co., 42 Zozsef, Budapest VIII., Hungary
SCHON & KREIDEL LUDW. III. Rasumowskygasse 29 Wien
VACUUM OIL COMP. Akt. Ges., Almas Fuzito, Ung

BELGIAN.

BELGIAN BENZINE Co. (*Motogazolin*), Haren-Nord
MOTTAY & PISCART (*Motocarline*), Haren-Nord-lez-Brussels

BRITISH.

ANGLO-AMERICAN OIL Co., Ltd., 36-38 Queen Anne's Gate, Westminster, London, S.W. (*Pratt's*)
BOWLEYS & Son, Wellington Works, Battersea, London, S.W.
BOWRING PETROLEUM Co., Ltd., 5 Billiter Avenue, E.C.
BRITISH PETROLEUM Co., 22 Fenchurch Street, London, E.C. (*Shell*)
CARLESS, CAPEL & LEONARD, Hope Chemical Works, Hackney Wick, London, N.E.
GAS LIGHTING IMPROVEMENT Co., Ltd. (*Carburine.*) 7 Bishopsgate Street Without, London, E.C.
Royston Castle, Shore Road, Granton, Edinburgh
SHELL

BRITISH COLONIES, etc.

WILSON (J.), 119 Rue Common, Montreal, Canada

DANISH.

BEAUVAL & SAXLUND, 18 Kobmagergade, Copenhagen
MEYER & HENCKEL, 60 Kobmagergade, Copenhagen

FRENCH.

AUBRY, 50 Rue Saint Denis, Aubervilliers (Seine)
BAUDOY, 71 Avenue des Ternes, Paris
BARTHELEMY, 23 Rue de la Station, Villiers-sur-Marne (Seine & Oise)
BAYON, 193 Rue du Paubourg, Poissoniere, Paris
BEDFORD PETROLEUM Co., 67 Boulevard Haussmann, Paris
BOUQUOT, 44 Rue de Longchamp, Paris
BOXHORN, 50 Boulevard Haussmann, Paris
CARBURANTS (Societe Francaise des), 10 Rue Saint-Ferdinard, Paris
DESMARAIS FRERES, 42 Rue des Mathurins, Paris "AUTOMOBILINE"
DEUTSCH (Les fils de A) 50 Rue de Chateaudun, Paris (*Moto-Naphta*)
ESSENCE MOTRICINE (Cie Industrielle des Petroles) 12 Rue Planche, Paris
EOLINE (Raffinerie de Petroles du Nord) Croix-Wasquehal (Nord)
FANTO (Cie Des Petroles), 74 Rue St. Lazare, Paris
FENAILLE & DESPEAUX 11 Rue de Conservatoire, Paris (*Benzo Moteur*)
FIRBACK (E.), 16 Rue Violet, Paris
FLEURY, 7 Rue du Landy, Saint-Denis (Seine)
GERFAUD (C.), 26 Rue du Chateau-d-Eau, Paris
GRAMMONT (Raffineries) Tours (Indre & Loire)
GUILLAND & VALLET, 36 Chemin St. Mathieu, Lyon (Rhone)
HAMELLE, 21 Quai de Valmy, Paris
HUILES VITESSE (Cie des) 19 Rue des Minimes, Courbevoie (Xeine)
LANGSTAFF, EHRENBERG & POLLACK, 12 Rue d'Enghien, Paris
LASSAILLY 12 Rue d'Oncy, Vitry, (Seine)
LECLERC, Grande Rue a Cany-Barville (Seine-Inferieure)
LEFRETRE, 18 Rue Barbes, Montrouge (Seine)
LILLE, BONNIERES ET COLOMBES (Soc. Anym.) 10 Rue de Calais, Paris
NAPHTE CASPIEBBE ET DE LA MER NOIRE (Societe), 26 Rue Lafitte, Paris
PETROLES (Compagnie Generale des) 2 Rue Fougate, Marseilles (B. & R.)
PETROLES (Compagnie Industrielle des), 12 Rue Blanche, Paris
PETROLES DE BINAGADI BAKOU (Soc. des), 11 Place des Vosges, Paris
RAFFINERIE de PETROLE de DUNKERQUE, 59 Rue du Rocher, Paris
RAFFINERIE DE PETROLE DU NORD, 73 Rue Lafayette, Paris
TOURNEL, 18 Avenue d'Italie, Paris
WALLET, 69 Avenue de Wagram, Paris

GERMAN.

AKT. GES. PETROLEUM INDUSTRIE, Siegmundstr. 50 a. Nunberg
BENZINWERKE, Rhenania G.m.b.H., Dusseldorf-Reisholz
BENZINWERKE WILHELMSBURG G.m.b.H., Wilhelmsburg a. Elbe
BERLINER BENZIN WERKE G.m.b.H. Rittergutstr 102/103 Berlin-Lichtenburg
BREINIGTE BENZINFABRIKEN G.m.b.H., Hamburg
DEUTSCH AMERIKANISCHE PETROLEUM GES., Alsterdamm, Hamburg
HAMBURGER BENZIMWERKE m.b.H., Hamburg
OELFABRIK H. BAUER & Co., Eichwaldstr 8/10 Frankfurt a. M.
PETROLEUM RAFFIN. vorm Korff "Velosin," Stephanikirchenwede 20 Bremen
RHEINISCHE BENZINWERKE m.b.H., Eupenerstr 46 Coln a. Rh.
SUDD. BENZINWERKE m.b.H. "Stellin" Motonaphtha Gasoline-Benzin, Ludwigshafen a. Rh., Mundenheim
STADING & Co., W., Fabrik, Eisenbahnstr 8 Bohlitz-Ehrenberg b., Leipzig
ZELLER & GMELIN, Benzin Raffinerien, Esslingen, Wrttbg.

ITALIAN.

ARNOLDIE (G.) & Cie, 37 Via Pavlo da Cannobis, Milan
PETROLI D'ITALIA (Soc.) (*Italia*), 12 Via Andegari, Milan
PETROLIO (Soc. Ital. Americana), 76 Piazzi Cinque Lampa, Genoa

ROUMANIAN.

AQUILA, Franco-Romana, Bucharest
ETOILE ROUMAINE, Bucharest

RUSSIAN.

KAISER (B.), Baku
NANOYAN & Cie, Batum
PITOEFF & Cie, Taflis
SCHIBAEFF & Cie, Baku
TER-AKOPOFF, 3 Place Isaac, St. Petersburg

SPANISH.

CATASUS & Co., 1 Colon, Barcelona
DESMARIS FRERES, 8 Rue Claire, Madrid
FOURCADEY PROVOT, 8 Calle de Fernaflor, Madrid
VILELLA, Tarragona

SWISS.

HUILES MINERALES (SOCIETE SUISSE POUR LE COMMERCE DE), Route de Frontenex, Geneva
OMNIA S.A., Genf-Chene-Bourg.
SOCIETE ANONYME, Lumina, Genf.

U.S.A.

ELLIS & Co., 11 Broadway, New York
PETROLEUM OILS TRUST, 27 William Street, New York
PURE OIL Co., 11 William Street, New York

PROPELLERS.

AUSTRIAN-HUNGARIAN.

GEBRUDER BLAHA, IX Simondenkg 9 Wien

DIETRICH, Jun. Jak. IX/4, Nussdorferstr 42/44 Wien

WERNER-PFLEIDERER-OESTERR. Industriewerke Komm. Ges. Odonkerg. Wien

BELGIAN.

WANSON (Maurice), 16 Rue Jean Spas, Brussels

BRITISH.

AVRO (See Roe (A. V.) & Co.)

BLACKBURN (B.), Balm Road, Leeds

BRITISH & COLONIAL AEROPLANE Co., Ltd., Bristol

BROWN Bros., Ltd., 22-34 Great Eastern Street, London, E.C.

CLARKE (T. W. K.) & Co., 26 Charges Street, London, W.

DOVER AVIATION Co., Ltd., Dover *(Normale)*

GENERAL AVIATION CONTRACTORS Ltd., 30 Regent Street, London, S.W. *(Rapid)*

GRAHAME-WHITE (C.) & Co., Ltd., 1 Albemarle Street, Piccadilly, London, W.

HANDLEY PAGE, Ltd., 72 Victoria Street, London, S.W.

HOLLAND & HOLLAND, 479-483 Oxford Street, London, W.

MADISON DYNAMO ELECTRIC Co., Littleover, Derby

MOTOR ACCESSORIES Co., 55 Great Marlborough Street, London, W.

PICCOTT (Bros.) & Co., Ltd., 220-222-224 Bishopsgate, London, E.C.

ROE (A. V.) & Co., Brownsfield Mills, Manchester

SMITH & DOREY (G. H. & W. H.), Ltd., 14a Great Marlborough Street, London, W.

SPENCER & SONS (C. G.), 86a, Highbury Grove, London, N.

TWINING AEROPLANE Co., 29b Grosvenor Road, Hanwell, London, W.

WEBB, PEET & Co., Gloucester

WRIGHT (Howard T.) (See Howard Wright)

WOOD (T.B.), Littleover Works, Derby

FRENCH.

AERA, 16 Avenue de la Grand Armee, Paris

APPAREILS AERIENS (Société de Construction D'), 36 Rue du Bois, Levallois-Perret

AVIA (Société Générale D'Industrie Aéronautique), 62 Rue de Provence, Paris

BAUDOT & PAZ, 22 Avenue de la Grande Armée, Paris

BAUJARD (Claude), 309, Faubourg Sainte-Antoine, Paris *(Eola)*

BERTHAUD, 18 Cours de la Republique, Lyon-Rhone)

BREQUET (Louis), Boulevard Urbain, Douai

CENTRAL AERO, 89 Avenue des Ternes, Paris

CHAUVIÈRE (L.), 82 Rue Servan, Paris *(Integrale)*

CHERVILLE (M.), 6 Place de l'Odéon, Paris.

DOREY (W.H.), 14 Rue Torricelli, Paris

DURVILLE (P. N. G.), 38 Rue Jouffroy, Paris.

EOLA *(See* Baugard)

ESNAULT-PELTERIE (ETABLISSEMENTS), 149 Rue de Silly, Billancourt *(R. E. P.)*

GENDRE, 89 Rue de Cormeilles, Levallois (Seine)

GODARD (Louis), 170 Rue Legendre, Paris

GREMONT, 40 Rue Saint-Denis, Asnieres (Seine)

HELICE METALLIQUE AERIENNE, 38 Rue Villiers de l'Isle-Adam (L.F.)

KAPFERER (M.), 2 Avenue de Messine, Paris *(Aeropropulser). (A.P.)*

KOECHLIN (P.), 43 Rue Denfert-Rochereau, Boulogne, S.

LABANHIE ET RUTHER, 2 Rue de Seine, Suresnes

LAMBERT, 39 Boulevard Rouget de l'Isle, Montreuil (Seine)

"Centrale"

LETORD & NIEPCE, 15 Rue Paira et 23 Terre-Neuve, Mendon *(Dargent)*

LEVASSEUR, 140 *bis*, Rue de Javal, Paris

LIORE & OLIVIET, 48, Boulevard de la Révotte, Levallois

MAUVE, 15 Rue des Acacias, Paris

"MAXIMA," 38 Rue Legendre, Paris

"MERCURE," 155 Rue de Belleville, Paris

MEUGNOT & LA CLEMAUDIERE, Arc-les-Gray (Haute-Saone)

MOMER & CARRIOT, 295 Faubourg Saint-Antoine, Paris "Correct"

PANHARD & LEVASSOR (Société Des Anciens Etablissements), 19 Avenue D'Ivry, Paris

PASSERAT & RADIQUET (Etablissements), 127 Rue Michel-Bigot, Paris *(Progressive)*

PELLIAT (L.), 28 Rue du Chateau, Asnières (Seine) *(Rationnelle*

PEYZARET-PARANT, 4 *bis*, Rue Louis-Philippe, Neuilly-sur-Seine, Paris

RATMANOFF, 41 Rue Emile Duclaux, Suresnes, (Seine) *(Normale)*

RÉGY FRERES (Les Fils de), 120 Rue de Javel, Paris R.F.

R. E. P. *(See* Esnault-Pelterie)

ROSSEL-PEUGOT, Sochaux, près Montbéliard (Doubs) (Société Anonyme des Constructions Aériennes)

TELLIER (CHANTIERS), Juvissy

THOMAS, Berck-Plage (Pas-de-Calais)

THOMAS, 8 Rue des Tanneries, Paris

VALENTIN, 116, Cours de Vincennes, Paris "Centrale"

VINOGRADOW (MICHEL), 83 Quai d'Issy, Issy-les-Moulins

VOISIN, 34 Quai du Point-du-Jour, Billancourt

VUITTON (LOUIS), 1 Rue Scribe, Paris

GERMAN.

ANHALTISCHE FAHRZEUG WERKE, Robert Krause, Abt. IV., Dessau, Anhalt

AUER, CHR. FABR. Flugmach. u. Luftschiffschrauben, Cannstatt

BASSE & SELVE, Propeller aus Holz und Aluminium für Flugzeuge Altena i. Westfalen

ERSTE-DEUTSCHE AUTOMOBIL-FACHSCHULE, Mainz

FAERBER, A. & Co., Haideweg, Hamburg-Uhlenhorst

FICHTEL & SACHS, Schweinfart A.M.

"GARUDA," Propellerbau Ges. m.b.H. Naumburgerstr 42/43 Berlin

GNADIG, E., Berliner Str. 44 Staaken b. Spandau

HEINE & RUGGEBRECHT, Waidmannslust bei, Berlin

HINTZE PAUL HOFL., Leibnitzstr 102 Berlin-Charlottenburg

"INTERGAL" PROPELLERWERKE G.m.b.H. Buro & Fabrik Gunderodestr 5 Frankfurt a. M.

JOHANN SCHROTH, Brunn b. Einskirchen i. Bay

KOLN-EHRENFELDER MECH. MODELLFABR. Hugot, Koln-Ehrenfeld

PARSEVAL, Bitterfield

RESCHKE, Franz, vorm. Julius Metzer, SO. 36. Wienerstr 18 Berlin

SCHLOTTER (G.A.), Dresden-A. 16

SWISS.

GEISSBERGER C. & R. m "Rapid" Propeller. 10 Wiesenstr, Zurich

U.S.A.

AERIAL PROPELLER Co., White Plains, New York

AMERICAN PROPELLER Co., Washington, D.C. *(Paragon)*

BRAUNER (P.) & Co., 335-339 East 102nd Street, New York

CRAFTSMAN PERFECT PROPELLERS, 626 Erie Avenue, Chicago

DETROIT AERONAUTIC CONSTRUCTION Co., 306 Holcomb Avenue, Detroit, Michigan

DUQUET (L. G.), 107 W. 36th Street, New York

GREEN (Rurl. H.), 515 Delta Building, Los Angelos, Cal.

HOLBROOK AERO. SUPPLY Co., Joplin, Mo.

REQUA-GIBSON, 225 West 49th Street, New York

STUPAR (M.), 9626 Erie Avenue, Chicago

WILCOX PROPELLER. Box 182, Madison Square, New York

RADIATORS.

BELGIAN.

TOLÉRIE AUTOMOBILE BELGE, 17 Rue des Boyaux, Liége

BRITISH.

ALBANY MANUFACTURING Co., Willesden Junction, London, N.W.

COVENTRY MOTOR FITTING Co., Far Gosford Street, Coventry

DOHERTY MOTOR COMPONENTS, Ltd., Coventry

LAMPLOUGH & Son, Ltd., Willesden Junction, London, N.W. *(Lamplough-Alborn)*

MOTOR RADIATOR MANUFACTURING Co.:—
Parkside, Coventry
23 Tanner Street, Bermondsey, London, S.E.

SPIRAL TUBE & COMPONENTS Co., Caledonia Street, King's Cross, London, N.

FRENCH.

AERA, 16 Avenue de la Grand Armee, Paris
AMOUDRUZ, 39 Rue des Acacias, Paris
ARQUEMBOURG (Louis), 157 Faubourg, Saint-Denis, Paris

BANNEVILLE, 119 Rue Saint-Maur, Paris
BARDOU (E.), 130 Rue Victor-Hugo, Levallois-Perret
BAUDIER (Ch.), 30-32 Rue Baudin, Levallois-Perret
BISIAUX, 11 Rue Petit, Paris
BONDIN, 47 Rue de Cormeilles, Levallois-Perret (Seine)
BONFILS, 37 Avenue de Saint-Mandé, Paris
BRACHTEN ET GALLAY, Bellegarde (Ain)

CENTRAL AERO, 89 Avenue des Ternes, Paris
CHAMPESME, 5 Rue La Vieuville, Paris
CHAROY (G.) Et Cie, 5 Boulevard Voltaire, Paris
CHAUSSON Freres, 27 Rue Malakoff, Asnieres
CHIROL & Cie, 53 Rue de Lorraine, Levallois-Perret
CHOBERT, 41 Rue Villiers de l'Isle-Adam, Paris
CHOUBERSKY (Société Anonyme des Etablissements), 20 Rue Félicien-David, Paris
COCHAUX (Emile), Deville (Ardennes)

DARBILLY (J.), 198 Boulevard Pereire, Paris
DESNOYERS Freres, 116 Boulevard Richard-Lenoir, Paris
DURAND, GIROUX & Cie, 18 Rue de la Montjoie, Saint-Denis (Seine) Paris

ELECTRIC ACETYLENE, 52 Rue Balay, Saint-Etienne
ELOY (Lucien), Rue Louis Soyer, Villemomble
ENTREPOT METALLURGIQUE (L.), 5 Passage de l'Industrie, Paris
ESTABLIE Freres, 11 Boulevard Jules Ferry, Paris

FREES (De), 19 Rue de Recroy, Paris
FOREST (G.) et Cie, 32 Boulevard Henri-IV., Paris

GAY ET BOURGVENS, 78 Rue Louis-Blanc, Lyon (Rhone)
GINEST & TROUSSELIER, 47 Rue des Arts, Levallois (Seine)
GOUDARD MENESSON, 190 Avenue du Neuilly, Neuilly-sur-Seine
GRIMMEISEN (Ch. & G.), 5 et 7 Passage Piver, 92 Faubourg du Temple, Paris
GRENIER & MERCIER (SOCIETÉ ANONYME DES ETABLISSEMENTS), 8 Avenue de Bouvines, Paris
GROUVELLE, ARQUEMBOURG ET Cie, Rue du Moulin-Vert, Paris *(Arécal)*

LABIS & Cie, 86 Rue de Villiers, Levallois-Perret
LAMBERT (P.) et Cie, 109 Rue de Paris, Puteaux
136 Rue Vitruve, Paris
LE BRUN ET LECOMTE, 14 Rue Victor-Hugo, Puteaux
LECOMTE & ROSE, 14 Rue Victor-Hugo, Puteaux, (Seine)
LIOTARD Freres, 22 Rue de Lorraine, Paris
LONGUEMARE, 12 Rue du Buisson Saint-Louis, Paris
LORTHIOY (E.), 9 Avenue du Clos, St. Maur-les-Fosses

MARCHAL (A.), 9 Rue de l'Hotel-de-Ville, Neuilly-sur-Seine
MONTBARBON (Société Anonyme), 47 *bis*, Rue de Villiers, Neuilly-sur-Seine *(Lutetia)*
MONNET & MOYNE, 11 Rue Torricelli, Paris
MOREUX (G.) & Cie, 24 Rue Fromont, Lyon (Rhone)
MOREUX, 20 Rue Gravel, Levallois (Seine)

OSSANT Freres, 29 Rue Arago, Puteaux

PRINI ET BERTHAUD, 23 Rue Servan, Paris
PROUX, Boulevard Pont-Ochard, Poitiers (Vienne)

RADIATORS ET RÉFRIGÉRATEURS (Société des), 54 Rue de la Chapelle, Saint-Ouen
ROSSEAU, 32 Rue Fontaine-au-Roi, Paris

SCHLEY, Et Cie, 204 Rue Saint-Maur *(Loyal)*
SERRAVAL (De) Et MASSE, 17 Rue David, Lyon (Rhone)
STAMM, 29 Rue de Mogador, Paris

TOPOLSKI, 53 Boulevard de Belleville, Paris

VIGNEAUX, 5 Rue Bawn, Paris

GERMAN.

BASSE & SALVE, Kuhler aus Aluminium, Altena i. Westfalen

HAEGLE & ZWEIGLE Metallwarenfabr, Esslingen a. N.

MITTELDEUTSCHE KUHLERFABR. Teves, Braun G.m.b.H., Lahnstr 52 Frankfurt a. M.

NEUE INDUSTRIAWERKE G.m.b.H., Hohenmarkstr 24 Oberursel i. Taunus

RHEINISCHE AEROWERKE, G.m.b.H., "RAWE" Kuhler, Schanzenstr 86 Eusenheim, Rhein

SAUERBIER FRANZ, SO, 36 Forsters, 70, a., Berlin
SUDDEUTSCHE KUHLERFABR, Inh. Julius Friedr. Behr Federbach-Stuttgart

WINDHOFF HANS, Spez. Aluminium Luftschiff-Kuhler, Muhlenstr 8 a., Berlin-Friedeman

ZIMMERMANN, Otto, Dr. Spez, Fabr. f. Rohrenapparate, Ludwigshafen, a. Rh.

ITALIAN.

ALGOSTINO, BALAGNA, MAGNINO & Cia, 107 Madama Cristina, Turin

BONO & Co. (Societa Italiana), 54 Corso Porta, Vittoria, Milan

GALIMBERTI, 20 Via Senato, Milan

SPANISH.

COROMINAS (Ricardo), 45 Torrente de la Olia, Barcelona

SWISS.

HENNEBERG & DEY, à la Jonction, Geneve-Frontenex

U.S.A.

AERIAL NAVIGATION Co., of AMERICA, Girard, Kansas *(Call.)*

EL ARCO Co., 6 East 31st Street, New York

KINSEY MFTG. Co., Dayton, Ohio

LIVINGSTONE RADIATOR Co., 6 East 31st Street, New York
LONG MFTG. Co., 1430 Michegan Avenue, Chicago

MAYO RADIATOR Co., New Haven, Con.
McCORD & Co., 1400 and 1440 Old Colony Buildings, Chicago
MOTOR COMPONENTS MFTG. Co., 119 E. Walnut Street, Destmoines, Iowa

ROME-TURNEY RADIATOR Co., East 31st Street, New York

WOLVERINE RADIATOR Co., 124 Sidney Avenue, Detroit, Mich.

ALPHABETICAL INDEX OF AEROPLANES.

Abbreviations.—Aust.=Austro-Hungarian; Bel.=Belgian; Brit.=British; Ger.=German; Ital.=Italian; Jap.=Japanese; Rou.=Roumanian; Rus.=Russian.

A

	PAGE
A.E.G., Ger.	117
Aerial Exhibition Co., U.S.A.	191
Aerial Yacht Co., U.S.A.	191
Aeronnic, French	75
Aeronautical Supply Co., U.S.A.	134
Ago, Ger.	118
Aircraft Factory "B. E." Brit.	73
Aircraft Manufacturing Co., Brit.	54
Albatross, Aust.	19
Albatross, Ger.	119
American Aeroplane Supply House, U.S.A.	191
Antoinette, French	75
Antoni, Ital.	154
Ask, Swede	180
Astra, Ital.	154
Astra, French	98
Astralis, Ger.	121
Avanti, Rus.	171
Avro, Brit.	33

B

Baldwin, U.S.A.	192
Balsan-Sanchez, French	76
Bamburgh, British	56
Bantam, U.S.A.	193
B.F.W., Ger.	122
Blackburn, Brit.	57
Blériot Aeronautics, Brit.	59
Blériot, French	77
Blériot, Ital.	157
Boland, U.S.A.	193
Borel, French	78
Bossi, Ital.	154
Breguet, French	79
Bristol, Brit.	58
Bristol, Ital.	157
British Breguet Co.	59
British Caudron	59
British Deperdussin	59
British Dunne-Levasor	59
British Farman	59
British Harriets	59
British Nieuports	59
Brzezowski, Rus.	171
Burgess, U.S.A.	194

C

Caldevara, Ital.	155
Caproni-Bristol, Ital.	156
Caproni, Ital.	156
Caudron, French	81
Chiribiri, Ital.	156
Christmas, U.S.A.	196
Clement Bayard, French	82
Cooke, U.S.A.	196
Cordeaux-Enoe, U.S.A.	196
Coventry Ordnance Co., Brit.	60
Curtiss, U.S.A.	197

D

Dahlbeck, Swede	180
De Bouckere, Dutch	66
Deperdussin, French	82
Deperdussin, Ital.	157
Deutsche Sommer, Ger.	122
D.F.W., Ger.	123
Doutre, French	85
Doune, Brit.	61
Dux, Rus.	171

E

E.A.C., Brit.	62
Enter, Ger.	124

F

Farman, H., French	85
Farman, M., French	85
Flugmaschin Friedrich, Ger.	126
Fokker, Dutch	66
Fokker, Ger.	127
Frisch, Ital.	158

G

Gallaudet, U.S.A.	198
Gelnotschew, Rus.	171
Gilbert, Rus.	171
Goedecker, Ger.	126
Gothaer Waggon, A.-G. Ger.	127
Gouppy, French	87
Grade, Ger.	128
Grahame-White, Brit.	62
Guidoni, Ital.	158

H

Hamilley Page, Brit.	45
Hanuschke, Ger.	128
Howard-Flanders, Brit.	44

J

Jatho, Ger.	129
Jeannin, Ger.	129

K

Kennedy, Rus.	171
Kirkham, U.S.A.	199
Kondor, Ger.	130
Kuhlstein, Ger.	142

L

Lake Flying Co., Brit.	46
Loening, U.S.A.	199
Loh, Ger.	130
Lloyd's Aircraft Co., Aust.	19
L.V.G., Ger.	131

M

Mars, Ger.	131
Martinsyde, Brit.	47
Mounier-Harper, Dutch	66
Morane-Saulnier, French	88
Moreau, French	89
Motor, Rus.	171

N

Nieuport, French	90
Nieuport, Ital.	159
Nyman, Swede	180

O

Oertz, Ger.	132
Otto, Ger.	35

P

Pegs-Enich, Ger.	132
Pemberton-Billing	48
Piquet-Noll, Ger.	132
Pomier, French	91

R

R.E.P., French	92
Rodjestwensky, Rus.	171
Rumpler, Ger.	133
Ruth-Rohde, Ger.	135

S

Scheles, Ger.	134
Schmitt, French	93
Schulze, Ger.	134
Schwade, Ger	134
Selfes, U.S.A.	199
Short, Brit.	49
Sigismund, Ger.	135
Sloane, U.S.A.	199
Sommer, Ger.	135
Sopwith, Brit.	50

T

Thomas, U.S.A.	200

U

Union Flugzeugwerke, Ger.	136

V

Van den Burg, Dutch	66
Vendome, French	95
Vickers, Brit.	51
Viazin, Rus.	168
Voisin, French	94
Vreedenburgh, Dutch	66

W

Washington Co., U.S.A.	201
Westphal, Ger.	136
White, Brit.	52
Whitehead, Aust.	19
Wittemann, U.S.A.	201
Wright, Ger.	136
Wright, U.S.A.	202

Z

Ziegler, Ger.	136

ALPHABETICAL INDEX OF DIRIGIBLES.

	PAGE
Adjutant Reau, French	98
Adjutant Re Vincennot, French	102
Astra, French	98
Astra Torres, French	99
Astra Transaerien, French	98
Baldwin, U.S.A.	394
Beta, British	55
Capitaine Ferber, French	108
Capitan Marechal, French	104
Citta di Milano, Italian	139
Colonel Renard, French	98
Commandant Coutelle, French	109
Delta, British	55
Dupuy-de-Lôme, French	102
Eclaireur Conte, French	98
E. Montgolfier, French	102
Forlanini, German	161
Fleurus, French	109
Gamma, British	55
Hansa, German	149
Italia, Italian	161
Jastreb, Russian	173
Kommissiony, Russian	173
La Belgique II & III, Belgian	24
Lebedj, Russian	173
Leonardo da Vinci, Italian	161
Le Temps, French	107
Liberté, French	104
Lieut. Chaure, French	98
M 1 & M 2, Italian	159
M IV, German	138e
P.L, Italian	159
P. L I, German	140
P. L 2, German	141
P. L 6, German	142
P. L 8, German	142
P. L 3, German	143
P. L XII, German	144
P. L 16, German	144
P. L 19, German	143
P. L II, German	145
Parseval, British	54
Parseval, German	146
Parseval, P. L 17, Italian	159
Parseval, Japanese	165
Parseval, Ez 10, Turkish	185
Schütte-Lanz II, German	145
Selle de Beauchamp, French	104
Spiess, French	110
Usnelli, Italian	161
Viktoire Luise, German	148
Ville de Bruxelles, Belgian	23
Willows, British	56
Yamada, Japanese	165
Z I, German	148
Z II, German	148
Z III, German	149
Z IV, German	149
Zeppelin, German	146, 4c
Zodiac III, French	107
Zodiac XII, French	100
Zodiac XIII, French	109

00109548

Digitized with financial assistance from the
Observer Research Foundation
on 25 April, 2019